THE ATHENÆUM

Journal of English and Foreign Literature, Science, and the Fine Arts.

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5. SACRED CHRONOLOGY; JARVIS AND BROWNE.
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for OCTOBER, with Index of Nos. LXXXVIII. and LXXXIX.

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LXXV. for OCTOBER, with Index of Nos. LXXIII. and LXXIV.

Contents.

1. Principles of Taxation: M'Culloch.
2. The Microscope and its Revelations.
3. Architectural Study, &c. (with Illustrations).
4. Free-Trade Prospects; Repeal of the Corn Laws.
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The first number of THE MUSIC BOOK will be published on Saturday October 3. It will consist of a New Song by Balfe (the Composer of the 'Bohemian Girl,' &c.), entitled 'Sing, Maiden, Sing;' the Words selected (by permission) from the Works of Barry Cornwall. The following Songs will be published in October:—

No. I.—Sing, Maiden, Sing. The Words by Barry Cornwall. The Music by M. W. Balfe.

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No. III.—The Song of the Seasons. Words by Barry Cornwall. Music by J. H. Tully.

No. IV. My Home must be where'er thou art. Words by Mark Lemon. Music by Mrs. G. à Beckett, composer of 'Agnes Sorel,' 'Red Riding Hood,' &c.

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London: Published at the Office of 'The Music Book,' No. 1, St. Bride's Avenue, Fleet-street (leading to St. Bride's Church), and sold by Booksellers, Newsmen, and Dealers in Periodicals, who will regularly supply the Work, and to whom orders should be immediately given.

LONDON, SATURDAY, SEPTEMBER 26, 1846.

REVIEWS

History of Provençal Poetry—[*Histoire de la Poésie Provençale*]. By M. Fauriel. 3 vols. Paris, Labitte.

PERHAPS no department of ancient literature ever found such favour in the eyes of the public as the Provençal. Nor is this surprising, when we call to mind its many picturesque accessories. The offspring of no barbarous clime, of no rude people—but cradled in "the sweet south," and among a race with whom much of the civilization of the ancient world still lingered—watched over by brightest eyes, and taught to "lisp in numbers" in the lavender-strewn halls of Arles and Toulouse—its very origin was romantic. Then, its votaries were not the rude bard who followed his chieftain with harp and brand to the battle, ready alike for the fight or the carouse—nor the minstrel, whose resting-place might be the hostel, the hut, or perhaps the wide forest—but courteous knights and stately nobles garmented in silk and gold—for whom life was a pleasant pilgrimage from court to court, and whose guerdon for lay or *sirvente* was not the rude and substantial gifts that rewarded the less gentle bard, but the golden violet presented by fair hands, or the coronal of silver eglantine placed on the brow by some Countess of Narbonne or Clemence Isaure in the presence of some high court of Love. It could not be but that a literature so abounding in picturesque details should find favour both in England and France; and that pre-eminent among the popular figures of the Middle Ages "le brave troubadour," harp in hand, should take his station.

To this department of Middle-Age literature numerous French writers, from the time of Fauchet, have directed their attention; and even at the present time, the subject, notwithstanding M. Raynouard's elaborate work, seems to excite no common interest—since we have here three volumes comprising fifteen hundred pages devoted to 'La Poésie Provençale.' The work is a posthumous publication—the author a writer well known for his historical researches. Its original appearance was as a course of lectures delivered by M. Fauriel on his appointment to the chair of Foreign Literature in the University of Paris; and, as the result of many years' reading and much study, it is entitled to respect—although we cannot concede to Provençal literature the commanding position which the author assigns to it.

The early chapters, which treat of "the influence of Greek civilization on the south of Gaul," and of "Southern France under the Barbarians," are highly interesting—as showing both how completely Grecian the southern Gauls had become at the period of their subjugation to the Romans, and how little influence either the promulgation of Christianity or the irruption of the northern barbarians had upon the manners and superstitions of the former—as well as how inveterately the populace adhered to many a pagan rite even until within a few centuries ago. In the subsequent chapter, 'On the Origin of the Provençal Language,' we find the author regarding it as the offspring of the Latin, with a large admixture of words derived from some unknown tongue,—which he inclines to believe was that of ancient Gaul.

The period at which the Provençal became the language of Southern France is uncertain. The oath of Louis of Germany binding himself to the protection of Charles the Bald, which bears the date of 842, has been generally considered the most ancient example. M. Fauriel, however, remarks that, although this oath is the earliest specimen remaining, still there is much historical evidence to prove that a language distinct alike from the German and the Latin was in use centuries before. The earliest poetical specimens existing in this tongue are in two manuscripts which belonged to the Abbey of St. Martial of Limoges; and include, amongst several Latin compositions, a number of poems in the Provençal. To these M. Fauriel inclines to affix a date as early as the ninth century—an epoch as remote as can possibly be assigned to any poetical remains of the northern nations. The following is a portion of one of these poems:—

Beautiful Spring reigns in the flower-decked wood. The earth puts forth its herbage and the forest its green boughs.

There, a multitude of birds are singing: the least of all is the loudest and the sweetest-voiced.

It is Philomel; who, ascending to the summit of the grove and making the tree-tops tremble, prolongs through all the dark night his melodious complaint.

Why, little bird, ceases not thy mournful song? Seek'st thou by thy melody to vanquish the sweet music of the lyre?

A player on the dulcimer is listening to thy music; and princes awake to hear thee and praise the sweetness of thy song.

Oh! cease to weary thy little throat—cease to trouble with thy warbling those who long for sleep.

Thou hapless little bird! thou dost persist in thy singing! neglectest thy food, and *wilt* charm the whole world by thy melody.

The whole world listens; but thou hast none to aid thee—save only Him who gave thee thy voice.

But summer is come, and the bird is silent—occupied only with its young. It dies amid the fogs of winter.

How unlike is this to the poetry of an early stage of society!—how formal!—how carefully constructed!—how deficient in that element more than any other distinctive of the poetry of a rude people—spirit! It reads rather like the laborious trifling of some of the Latin poets of the fourth or fifth centuries; and seems to corroborate the opinion, which we are greatly inclined to adopt, that, just as the Provençal tongue was a corruption of the Latin, so Provençal poetry was that of the Lower Empire at second-hand. Yet, however slightingly we may look on "la gai saber,"—and few who have turned over the laborious collections of M. Raynouard will assign to it a very high place—no school of verse ever took so lofty a station as the Provençal. It was fostered, as we have said, by nobles and princes; and the earliest troubadour whose name has been handed down was the ruler of wide domains—Earl of Poitiers and Duke of Aquitaine. He was, too, the grandfather of our first Queen Elinor; who added her paternal lion to the two already blazoned on the shield of England. Earl William composed many pieces; and a few have been handed down—mostly characterized, as M. Fauriel observes, by the grossest immorality. From one of his less objectionable pieces a short extract is given. It is an eulogy upon one of his many lady-loves; and here is a portion:—

Pride must bow down before my lady; power must obey her—for her graceful carriage and sweet look.

Such a lady's joy might heal a dying man; her grief might bring death to one in health. She can make the wisest man a fool—the fairest, ugly—the most courteous, a churl, and the churl most courteous.

Fairer one can no man find, nor eye behold, nor tongue describe.

The reader will, we doubt not, consider this "Lord Fanny" specimen of early Provençal poetry quite sufficient.

The example of Earl William was followed by many of his contemporaries,—few of whom have left more than their names. About the middle of the twelfth century, Pierre d'Auvergne and Bernard de Ventadour flourished. Many of their poems may be found in Raynouard; and the name of the latter has some interest to the English reader, since Bernard de Ventadour was the favourite troubadour at the court of Queen Elinor. In all probability it was from him that her favourite son, Cœur-de-Lion, imbibed his love for "la gai saber." M. Fauriel gives some extracts from Bernard's poems; but they are as extravagant and artificial as those of his contemporaries:—and, although he was probably "the first troubadour who spread among the Anglo-Normans a notion of Provençal poetry," the boon was not so great a one as M. Fauriel deems it. At this early period the author of 'The Voyage of St. Brandan' had sung his graceful lay; while Wace had presented to Plantagenet his spirited 'Brût d'Angleterre,' and was engaged upon his still more spirited 'Chronicle of the Dukes of Normandy.'

Bernard had many contemporaries and many successors, vowed to the service of poetry and of some lady-love; but all their poems are wearying, though the varieties of their metre and extreme felicity of their diction awakened the applause and admiration of the highborn dames of the South. Foremost among these troubadours was Arnaud de Marveil; and he had the good fortune to become the favoured servant of the Countess of Béziers,—who could not resist "ses beaux vers." The reader may try a specimen:—

As the fish live in water, so do I live, and will ever live, in my love.

Love taught me to choose a lady, who makes me happy with no higher gift than hope. So great is her worth, that I know not whether I feel most of pride or shame. These two things has love combined in me—yet so that love and reason are not confounded.

Commonplace as these stanzas may appear to us, the Countess of Béziers found them so attractive that she rewarded their author "with armour and horses and beautiful garments." But poor Arnaud was fated to prove the inconstancy of his fair countess; who, flattered by the love of King Alphonso of Arragon, dismissed her troubadour from her service. Thereupon, he retired to Montpellier—"et mourut inconsolable." Yet we should hesitate to place Arnaud among the martyrs of *love;* since a duteous service to a fair lady insured the troubadour a very comfortable living—the loss of which might itself have been sufficient cause.

Raimbaud de Vaqueiras was another troubadour of great celebrity; and he paid duteous service to the fair Béatrix, sister of the Marquess of Montferrat. M. Fauriel has given several extracts from his poems;—but they are as artificial and studied as the rest. Indeed, how could *poetry* be cultivated when "l'amour, l'amour, l'amour," was the sole subject,—and the beauties of spring, and smiles or frowns of the singer's mistress, were the only variation of that unchanging theme? These troubadours were the Laureates of Love;—and there is something in a laureateship, as the annals of our poetry will show, that is fatal to true poetry.

Willingly passing over the remaining names, we come to the chapter entitled "Poésie—genre populaire." Here, something better might have, surely, been expected. The jongleur, freed from the trammels of elaborate versification and the formalities of a court life, should present us at least with some traits of manners and feelings which the high-born troubadour would overlook. But, alas! there was no populace in the South of France to listen eagerly to the rude ballad or wild legend. These "chants populaires" seem to occupy the same relation to more elaborate lyrics as did the Vauxhall songs of some forty or fifty years ago to such poetry as Mr. Hayley's or that of the Della-Cruscan school. They are composed for the genteel vulgar,—and intended, we are sure, to be sung only "to the genteelest tunes." Some of them are composed dialogue-wise,—a method which found great favour subsequently among the French poets of the 15th century, and which

finds great favour, also, with M. Fauriel. He characterizes it as "peculiarly lively, ingenious, and having a grace that belongs to all time." There is not much grace or ingenuity in the following, that we can discover. It is a dialogue between a knight and his lady:—

"Lady, I suffer cruel torment for you."
"Sir, this is folly, for I make you no return."
"Lady, in the name of Heaven, have pity on me."
"Sir, your prayers are thrown away on me."
"Fair lady, I love you so tenderly."
"Sir, I hate you above all men."

This contest of prayer and denial continues for some time; and then, the disconsolate lover turns to address himself to Love—who answers him in most *petit-maître* phrase, and recommends him to seek a kinder mistress. This the lover indignantly refuses;—and so the piece concludes. Sometimes the dialogue is between the troubadour and a dove, a nightingale, a parrot, or a swallow. A dialogue between an imprisoned knight and the latter is given;—but it is unbearably stupid. The pastorals are of the genuine drawing-room pattern; and many of these, translated literally from the Provençal, did duty in the gilded saloons of Paris, in the reign of Louis Quatorze, as original compositions. Indeed, we have often thought that the extravagant affectations, both in manners and literature, of "les précieuses ridicules" of that era had their origin in a partial revival of Provençal literature.

A more elaborate species of poetical dialogue was the *tenson*. In this, two, and often more, interlocutors took part—each maintaining or opposing a certain proposition. Such contests could only by the merest courtesy be called "poetic strife,"—since the formality of the whole must have chased the Muse far enough away. The questions, or propositions, offered in these *tensons* are, in the majority of instances, proofs both of the general immorality and general love of quibbling of the times. Some, however, are characteristic of the chivalrous spirit that prevailed. In one between Lanfranc Cijala and the Lady Guillaumette de Rosers, in the 13th century, the troubadour's proposition was this:—"Lady Guillaumette, twenty knights-errant, riding along in dreadful weather, lamented amongst themselves that they could find no shelter. They were overheard by two barons, passing, in great haste, to visit their ladies. One of the barons returned to aid the knights;—the other pursued his way to his lady. Which of these two did best?" M. Fauriel has not given the decision in this case:—nor in the following, which was also proposed about the same time:—"Which would you prefer," said Guijo, the Provençal troubadour, to another named Bernard—"an enchanted mantle by whose means you could win the love of all the dames,—or a trenchant lance that should bear to the ground every opposing knight, however valiant or strong?" In some instances, though very rarely, the question was political; as—"Which are most worthy to prevail in war," &c.—"the Lombards or the Provençals?"

The next chapter treats of poetry relating to the Crusades. To the indolent and voluptuous troubadour the summons to that "sweet land over the sea" must have been anything but pleasing. The call which, from superstitious feeling, and perhaps even more from characteristic love of adventure, was responded to so eagerly by the energetic natives of Northern Europe, grated harshly on the ear of "le brave troubadour;" who, if willing enough to place lance in rest at a tournament, had no fancy for aught that involved actual privation. Thus, the poems even of those who were compelled, by allegiance to their feudal superiors, to assume the Cross, most characteristically exhibit their reluctance—indeed, scarcely concealed hostility—to the cause. This, at least, was the case during the first and second Crusades:—to the third more than one illustrious professor of "le gai saber" addressed himself. Frederic Barbarossa, that renowned warrior-poet, and Richard Cœur-de-Lion, scarcely less renowned than he, both set forth; and, influenced, doubtless, by such leaders, many troubadours followed. Among these, were Pierre Vidal and Bertrand de Born; whose spirited, but ferocious, "Summons to War," so admirably translated by Lockhart, startles us in the midst of the affectations of troubadour poetry—and, first of his class, Peirols; whose celebrations of this Crusade are familiar to the reader of Sismondi.

Perhaps, of the various classes of Provençal poetry, the *sirventes*, or satires, are the best. In these we not only meet with occasional traits of manners, but often with humour. They are mostly, however, of wearisome length. The following, from Pierre Cardinal, is *naïve*:—

I see in many high places many barons, who show there like false stones in a ring. To take them for diamonds, would be an error like that of buying a wolf for a lamb. They are neither sterling nor full weight;—like the false money of Puy, on whose face are seen the flower and the cross, but which yield no silver when melted. From east to west, I offer to the world a new convention. To every true man I will give a bezant if every knave will give me a nail. To each courteous person I will give a gold mark, for a penny that each discourteous one shall give me. Every liar shall give me an egg, and I will give a pound of gold to every man of his word. No large parchment is needed to write down the laws that the majority of the world observe—half the thumb of my glove will suffice. One cake might feed all the honest men;—it is not they who make provisions dear. But he who would feast the evil doers need only cry in any direction—"Come and eat, brave men of the world!"

The remainder of the second volume, and the greater part of the third, are occupied by dissertations on the more celebrated romances extant in the Provençal; accompanied by extracts, and, in most cases, by an epitome of the story. That the romance of 'Ferabras' should be claimed as of Provençal—or, at least, of a Southern—origin, is not surprising,—since not only is it founded on the apocryphal expedition of Charlemagne against the Arabs in Spain, but the supernatural machinery bears strong marks of an Eastern origin. So, the romance of 'Gerard de Roussillon' is true, throughout, to the manners and feelings of the South of France. That lively little *nouvelette*, as it may be called, 'Aucassin and Nicolette'—already known to the English reader by its spirited abridgment in the Collection of the late Mr. Way—may, also, claim a Provençal origin. But when M. Fauriel demands the same for 'Blandin de Cornouailles' and 'Perceval,' we must demur. What did the troubadours of the South of France know of Cornwall?—and how unlikely was it that the romancer who could lay his scene either in Provence, Lombardy, or Arragon, should choose for a hero the native of a country which, at that period, was viewed as beyond the limits of the civilized world! As to 'Perceval,' the Celtic origin of the story—especially of all of it that relates to the San Graal—is generally acknowledged. That, at a later period than the palmy days of troubadour poetry, those who still used the same language should take a wide range in providing a variety of stories is likely enough; and thus, at second-hand, the heroes of the Arthurian cycle of romance,—even those of the Niebelungen Lied,—might come to find a place in the romances of Southern France,—just as the heroes of British story find a place in the poems of Ariosto and Pulci. The essential peculiarities of Provençal poetry, however, seem to us to prove that it must be viewed rather as lyrical than narrative. In the narrative poems of the *langue d'oil*, but one species of metre is used throughout an entire one, however long. Now, the number and variety of their metres was—after that of an elaborately-polished diction—the great boast of the troubadours. The greater number of those whose names have been handed down to us, too, were men of noble, or gentle, birth,—and almost as ambitious of the title of "preux chevalier" as of duteous servant to the Muse and the lady. A *chanson*, a *lai*, a *sirvente*, might be easily constructed by them; but what leisure had these knightly poets for the composition of metrical romances? Those of the *langue d'oil*, as we know, are mostly the work of poets who termed themselves "clercs-lisant"—a title which seems to prove their literary occupation. The Provençal romances, therefore, we should think are due to a similar class and date; after the decline of genuine troubadour poetry,—consequently, at a later period: and our opinion is corroborated by the large admixture of classical and Oriental allusions, as well as by the inveterate use of allegory.

M. Fauriel's work concludes with a long dissertation on the curious contemporary metrical 'Chronicle of the Crusade against the Albigenses,'—reviewed by us on its first appearance [*Athenæum*, No. 579]. The heartiness with which the writer, in the latter part of this curious Chronicle, anathematizes every aider and abettor of that infamous undertaking proves to us that, when actuated by strong feeling and a stirring subject, the Provençal author might take his place among a higher class than that of the mere weaver of fine sentences and wire-drawn similes.

Philip Musgrave; or, Memoirs of a Church of England Missionary, in the North American Colonies. Edited by the Rev. J. Abbott. Murray.

A tale of the "labours and perils, toils, difficulties and privations of the missionary life." The subject of the memoir has lived for the last twenty-five years in the backwoods of Canada. The tone of his narrative is different from that of similar works. A poor curate of the Church of England, overworked and underpaid, he gladly accepted the mission as a piece of preferment; and was not a little astonished when brought into contact with the unexpected trials of his new situation. The story of his sufferings and triumphs is not without interest:—but his feelings are somewhat contracted; and, though seemingly a kindly-disposed man, he expresses himself with too much bitterness on the sectarians and dissenters in his Canadian parish. On the whole, however, there is instruction to be gathered from his pages;—and, here and there, there is picturesque description. Of the nature of the ministerial duties to be performed in such a settlement the following short extract may give some notion:—

"On one occasion I was called upon one Saturday morning, I well remember it yet, to marry a couple at a settlement fifteen miles off. I started very early, and got back about five o'clock in the evening; weary and almost worn out, more by the excessive heat than by the length of the journey, and was very thankful to return to my comfortable home. But on giving my horse, which was about as tired as myself, to my servant, I was informed that a man was waiting for me, and had been for several hours, to go with him twenty-five miles to see his wife, who was thought to be at the very point of death. I directed my servant to give the man his dinner, and got my own; and then immediately set off with him on a fresh horse, and arrived at my journey's end about ten o'clock at night. I found the poor woman very ill, worse indeed than she had been represented to be. I sat up and talked and prayed

with her, or read to her, till four o'clock in the morning, when her happy spirit ascended to Him who gave it. I then threw myself on a sofa, which I found in an adjoining room, for an hour or two, and starting again for home, got there in time to take a hasty breakfast, and to dress for church, at eleven. Morning service over, I rode nine miles to one of my outposts, for evening service; and then home once more. I was up early the next morning, in order to be off in time for the poor woman's funeral, which was to be at ten o'clock, by my own appointment. As I mounted my horse, my servant, a raw but well-meaning Irish lad, said to me—'An is't aff again ye are? Sure an the horses'll be kilt, if the maister hisself is n't.' 'I cannot help it, John,' I replied; 'I must go.' 'Well, well!' he rejoined; 'I never seen the likes o'this afore! But there's no rest for the wicked, I see.' I cast upon him a searching look, to ascertain whether his remark was to be imputed to impertinence; but the simple expression of commiseration on his countenance at once convinced me that he meant no harm. I pushed on, for fear of being too late, to meet the funeral at the burial-ground, about three miles from the house of mourning. I was there far too soon, and had to wait several hours. There is an unwillingness on such occasions to be punctual; arising, I am inclined to believe, from the fear of being guilty of an undue and disrespectful haste 'to bury their dead out of their sight.' It was late in the evening when I got home; and, what with the fatigue and the heat of the weather and the want of rest, I was fairly worn out; and so ill as to be obliged to keep my room for three days."

This is a fair sample of the condition which Philip Musgrave describes at large. There were other kinds of annoyance, too; but they were personal, and might happen in any secluded neighbourhood. The author had faults of his own;—but these he confesses in so candid a spirit that they may be forgiven. Of the sort of interest which attaches to a narrative whose scenes lie among the Canadian wilds and rivers, a specimen may be offered:—

"A raft of timber on its way down the river to the nearest port was dashed to pieces by the violence of the rapids. There was the usual number of men upon it, all of whom, except two, were fortunate enough to get upon a few logs, which kept together, and were comparatively safe; whilst their two poor comrades were hopelessly contending with the tumbling waves, almost within reach of them, but without their being able to afford them the slightest assistance. After a minute or two, and when one more would have been their last, a long oar, or sweep, belonging to the wrecked raft, came floating by. They instantly seized it, and held on till they were carried down more than a mile, loudly calling for help as they went along; but what aid could we render them? No craft, none at least which were on the banks of the river, could live in such a boiling torrent as that; for it was during one of the high spring freshets. But the ferryman was of a different opinion, and could not brook the thought of their dying before his eyes without his making a single effort to save them. 'How could I stand idly looking on,' he said to me afterwards, 'with a tough ash oar in my hand, and a tight little craft at my feet, and hear their cries for help, and see them drowned?' He determined at all risks to try to rescue them from the fate which seemed to us inevitable. He could not, however, go alone, and there was not another man on that side of the river within half a mile of him. His sister knew this, and courageously, like another Grace Darling, proposed at once to accompany him in his perilous adventure. From being so often on the water with her brother, she knew well how to handle an oar. Often, indeed, without him she had paddled a passenger across the ferry in her little canoe. He accepted her proposal; and we had the satisfaction of seeing the light punt put off from the shore opposite to that from which we were idly and uselessly looking on, and go gallantly over the surging torrent towards the sinking men. We feared, however, that it would not be in time to save them, as their cries for help grew fainter and fainter, till each one, we thought, would have been their last. We saw that the oar, with the drowning men clinging to it, was floating rapidly down the middle of the stream; which in this particular locality is more than a quarter of a mile in breadth, and would, inevitably, in two or three minutes more be in the white water among the breakers, when their fate must be sealed, and the boat, if it followed, be dashed to pieces among the rocks. This was the principal point of danger, and they had to run down within a most fearful proximity of it in order to cross the course down which the drowning men were drifting, and, as they did so, to seize hold of them without losing their own headway; for there was not time for that. They succeeded in shooting athwart the current, rapid as it was, just below the men. With breathless and painful anxiety we saw them execute this dangerous manœuvre. We saw the ferryman lean over the side of his boat for a moment, as it passed them, while his sister backed water with her oar. 'They are saved!' some one said, close behind me, in a whisper so deep and earnest that I started, and turned to look at the speaker; when another, who heard him, exclaimed, 'No, No! they are gone! they are lost! the boat has left them.' And sure enough it had. But in an instant afterwards, just as we thought they were about to be driven into the fatal breakers, they turned, to our inexpressible delight, as if drawn by some invisible power (the rope the ferryman had attached to the oar was, indeed, invisible to us), and followed the boat. The ferryman and his sister had yet to pull a fearful distance for the time they had to do it in, to get out of that part of the current leading to the breakers. And they accomplished it. The man had the bow oar, and we could see the tough ash bend like a willow wand as he stretched out to keep the head of the boat partially up the stream. His sister, too, 'kept her own;' and the little punt shot out rapidly into the comparatively quiet stream, beyond the influence of that fearful current, which was rapidly driving them upon the breakers. When this was accomplished, our fears for the safety of the noble-hearted brother and sister were at an end, and we took a long breath; it was, indeed, a relief to do so. Still we continued to watch their further proceedings with the deepest interest. The moment they got into a less rapid current, which, they knew, led into comparatively still water, they ceased rowing, and allowed the punt to float down with it. The young ferryman now drew up the sweep alongside, and succeeded in getting the two unfortunate men into his boat. While he was doing this his sister went aft, and used her oar as a rudder to steer the boat. At the foot of the current, which they soon afterwards reached, there was no further danger. But we watched them still; and we saw them row ashore, on their own side of the river. One of the poor fellows was so much exhausted that the ferryman had to carry him on his back to the nearest house, where he soon recovered. Twelve months after this took place I had the satisfaction of presenting to this worthy ferryman, in the presence of above five hundred men, a beautiful silver medallion, sent out to me by the Royal Humane Society, to which I had transmitted an account of the occurrence. Nor was the heroine of my story forgotten. A similar medallion was given to him for his sister."

The volume forms No. 33 of Mr. Murray's 'Home and Colonial Library.'

A Glossary of North-Country Words, with their Etymology, and Affinity to other Languages; and Occasional Notices of Local Customs and Popular Superstitions. By John Trotter Brockett. Third Edition, corrected and enlarged by W. E. Brockett. 2 vols. Simpkin & Co.

THIS is an extended edition of a work which has been already received—as works of the class for the most part deserve to be—with favour. These at once enlarge our acquaintance with our great mother tongue, the Saxon, and introduce us to the daily life of our ancestors,—their customs, habits, opinions, and modes of thought. For this reason, we devote a few words to a publication which has kept both these objects zealously in view. In reference to the latter,—

"The Glossary," says the Editor, "has been made much more copious in the etymological department—alike interesting to the antiquary and the philologist. Every scholar is aware of the extraordinary analogy of various languages. In many of the articles will be frequently found noticed the words of similar origin, appearance, and meaning, in the cognate dialects, ancient and modern, of the North of Europe, which may be truly said to form the warp and the woof of English, and on which the flowers of Greece and Rome have been embroidered. Notices are also given of striking affinities, in sound and meaning, with different other languages; though these are not always sufficient to constitute an etymon."

Beyond the study of their analogies Mr. Brockett has another plea for the hunt after old English terms:—

"It is unnecessary to adduce reasons for preserving our old words. They are generally simple and expressive, and often more emphatic than their modern synonymes. By the revival of a more general relish for early English writers, the reader will imperceptibly acquire a habit of regarding them in the light of their pristine dignity. He will no longer hastily pronounce to be *vulgarisms* what are in reality *archaisms*—the hard, but deep and manly, tones and sentiments of our ancestors. The book will prove how much is retained by the ancient Saxon speech—in its pure unadulterated state—in the dialect of the North of England, which also exhibits more of the language of our Danish progenitors than is to be met with in any other part of the kingdom."

The author seems not to have been aware that many of the words which he considers peculiar to the four northern counties,—especially Durham and Northumberland—were diffused over the neighbouring shires of York and Lancaster, and, to a certain extent, of Chester. It is certain, too, that some of the words which he holds to be purely northern are known in the most southern of our English counties—and many more in the midland. A mere glance at other glossaries will prove this: and how numerous are such glossaries! In their present shape, they labour under the serious disadvantage of being adapted to the taste and feelings of individual districts only. This should be remedied,—and remedied, too, ere many of the words still current shall have passed into disuse. The truth is, we want, and have long wanted, a good *general* glossary of archaic and provincial words collected from the vernacular speech of every shire in England. Had such a work existed we should have been spared much of the ludicrous blundering achieved by writers who have pretended to explain Gower and Chaucer, and even by the commentators on Shakspeare. Indeed, such a work, well executed, would be an invaluable guide to the meaning of our old poets and dramatists. We have not to be told that it has been attempted more than once to supply this want; but the result of the attempt has been something not much better than the want itself. Yet no country in Europe can boast of richer, more varied, or more interesting materials for a comprehensive general glossary. These lie scattered through particular glossaries, local histories, and the reviews of both;—over a range so vast, in fact, as to defy the efforts of everything short of the most dogged and invincible industry. We need not wonder, therefore, at the signal failures to which we have alluded. We have adverted to the light which is thrown by some of our reviewers on the archæology of words. This is a most legitimate function of the true critic; since, by its exercise, he is supplying suggestions more or less valuable for the improvement of subsequent editions. With this view, then, we shall offer a contribution of our own for the consideration of Mr. Brockett's future editors.

"ASK, ASKER, ESK, a water newt, believed by

many, but without any foundation, to be venomous. *Lacerta palustrus.* Gael. *asc.*"

This is more generally a *land* animal,—about three inches long, and provided with legs. It is certainly venomous, too, (the *land* species) to the extent of raising a disagreeable and even painful swelling in the part affected.

"Baist, to beat severely. Isl. *beysta*, to strike. Swed. *basa*, to beat. In Scotland they use this word in the sense of *to overcome;* particularly at cards, where one has lost considerably. It is also used as a substantive—one who is overcome."

Its correct meaning is to beat until the sweat or even blood runs down;—and this application of the meaning to the *baisting* of meat is obvious.

"But and Ben, by-out and by-in,—or, as is very common, 'in-by,' the outer and inner apartment, where there are only two rooms. Many houses on the borders, where the expression is common, were so constructed; by placing two 'close beds' foot to foot, leaving a passage between them, the space behind them became 'ben,' or 'ben the house.' The phrase is undoubtedly *without and within.* Sax. *butan and binnan;* originally, it is supposed, *bi utan and bi innan. By* and *with* are often synonymous.

It's ill to bring *but* what's no *ben.*—*Sc. Prov.*"

The Lancashire pronunciation of this phrase is, *boot-in-bin;* and there, it alludes to something *left in the bin,*—some domestic store not required for present use, but reserved for another occasion. In this sense it is used by every peasant and labourer in the county:—"This is boot-in-bin," that is, "This will serve us another day."

"Cadger, a packman or itinerant huckster; one who travels through the country selling wares. Before the formation of regular turnpike roads from Scotland to Northumberland, the chief part of the commercial intercourse between the two kingdoms was carried on through the medium of cadgers. Persons who bring fish from the sea to the Newcastle market are still called *cadgers.*"

This word is more frequently pronounced *codger* (at least in Lancashire and the West Riding of Yorkshire); and it does not mean a packman merely, but a careful, thrifty collector of money, or property of any kind,—half a miser. It may come from the Spanish *coger*, or the Italian *cogliere.*

"Canting, a sale by auction. The derivation is evidently Ital. *incanto*, a public sale."

It would be more correct to say, "a *place* where anything is publicly sold, whether by auction or otherwise." The word is from the Latin *canto,*—alluding to the loud, measured tones in which wares of all kinds were anciently disposed of at public fairs.

"Chap, Chep, a customer. From Sax. *ceap ceap-man.* Hence, our word chapman, of which chap is an abbreviation.—Chap or Chep, is also a general term for a man; used either respectfully or contemptuously. In this sense it may be from Ital. *capo,*—quasi *caput.*"

The word does not signify "a customer," but a *vendor*—a dealer. It is not from the Latin—but is purely Saxon.

"Coble, or Cobble, a round hard stone found in the beds of streams, brought down from the mountains and rounded by the floods. 'As hard as a *coble,*' is a common expression."

Hence the word *cobbler,* — one who beats leather upon a stone of this kind.

"Delf, crockery ware; so called from having formerly been imported from *Delf*, in Holland."

Erroneous. It is from the Saxon *delfan* to dig; and signifies *stone*, or *sand*, or *clay*, or anything else dug out of the earth,—more frequently the first. It also means the *pits* from which such things have been dug.

"Edder, the long part of brushwood put upon the top of fences. Not in use, Dr. Johnson says. But I have heard the word in use in most of the Northern counties. Sax. *edor*, a hedge or fence.—*See* Yedder. Old Tusser recommends the farmer to

Save *edder* and stake
Stronge hedge to make.

"Edder, Eddre, the common viper. Sax. *ætter.* Still so called in Lancashire.—Todd's John. It may be added, in Northumberland and Durham also."

Yes,—and in the West Riding of Yorkshire. It evidently means an animal which lives under brushwood, furze, hedges, &c.

"Farand, *s.* state of preparation for a journey—fashion, manner, custom.—Farand-man, a traveller or itinerant merchant.—Farant, *a.* equipped for a journey—fashioned, shaped; as *fighting-farant*, in the fighting way or fashion; *well*, or *ill-farant*, well or ill-looking.—*See* Aud-farant.

He had wycht men and weill *farand*
Armyt clenly, bath fute and hand.—*The Bruce.*
She knew non suche in her lande,
So goodlie a man and well *farrand.*
Romance of Ipomedon, in Warton, Vol. I. p. 198.

All these expressions may be traced to the old verb *fare*, to go, to travel. Sax. *faran.* Dan. *fare.* Swed. *fara.* We may, as remarked by Dr. Willan, wonder at the ideas of foresight, preparation, and formal style connected with a journey in our island; but on reverting to the time of the Heptarchy, when no collateral facilities aided the traveller, we shall be convinced that a journey of any considerable extent, must have been an undertaking that would require much previous calculation, and nice arrangement."

Not quite satisfactory. In the contiguous parts of Yorkshire and Lancashire a *farant* person (man or woman) is a *good-looking* person;—and this is the meaning in the old poets.

"Gradely, decently, orderly. Sax. *grad, grade,* ordo. Rather, my friend, Mr. Turner, says, from Sax. *geradlic*, upright. *Gradely*, in Lancashire, he observes, is an adjective signifying everything respectable. The Lancashire people say, our *canny* is nothing to it."

This is a comprehensive as well as a forcible word, and alludes to anything done in the right or proper manner. It includes indeed both *time* and *manner*,—the *exact* time, the *perfectly right* manner.

"Holm, low flot land caused by alluvion—a small island. Sax. *holm.* Dan. *holm.* Germ. *holm.* Swed. *holm.* Dry grounds nearly surrounded by the course of rivers, and low and level pasture lands near water, are in Cumberland called Holms:—The *Holms* on Ullswater and Windermere.—*Dunholm*, the ancient name of Durham. Holm, in the Saxon language, generally signifies the sea or a deep water, but it is frequently used with an adjective to designate an insular situation."

This is very incorrect. *Holm* signifies land overgrown with natural trees, in the vicinity of water,—no matter whether flat or steep. Indeed, most holms we have seen have been far from level.

"Moider, to puzzle, to perplex, to confuse. It is, I suppose, an old word; but if one was to imitate some of our etymologists, it might be brought from the Spanish name of the seven-and-twenty-shilling pieces, which would, I dare say, very much *moider* poor John Bull in his reckonings."

This word is simply a corruption of *muddle.*

"Moor, a heath—a common or waste land. Sax. *mor*, ericetum. Isl. *mor*, terra arida, inculta, et inutilis. Sc. *mure, muir.* Dr. Jamieson erroneously supposes that our word *always* implies the idea of water or marshiness, as denoting a fen."

The word alludes neither to aridity nor marshiness; but simply to uncultivated land overgrown by *heath.*

"Mulligrubs, bad temper, ill-humour, fancied ailment—any indescribable complaint.

'Whither go all these men-menders, these physicians?
Whose dog lies sick o' th' *mulligrubs?*'
Beaumont and Fletcher—Monsieur Thomas.

It has no such meanings. In Lancashire, Yorkshire, and Cheshire it is confined to disordered bowels. It has the same meaning in the extract just given.

"Ravel, to speak in an unconnected manner, to wander. Dut. *revelen*, to rave, to talk idly."

It means simply to *entangle*, to *confuse,*—just as we would entangle a skein of thread.

"Shed, to put aside, to disperse, to separate, to divide. A learned and distinguished historian, Dr. Lingard informs me, that in Lancashire the word *shed* is used for, to surpass; 'that *sheds* all,' being a common expression of surprise, equivalent to 'that surpasses all that I ever heard of.' He further states, that he discovered, in the church-yard at Cockerham, the following inscription:—

'Here lies John Richmond, honest man,
Shed that who can!'"

To *shed* is one of the commonest words in Lancashire, and is used precisely in the sense mentioned by Lingard. Both he and the author might have added, that it is a mere corruption of *to shade,*—it throws every other thing into the shade.

"Slack, an opening between two hills, a valley, or small shallow dell. Su.-Got. *slak.* Isl. *slakr*, Slack, a long pool in a streamy river. Germ. *schlicht*, smooth."

Among the Lancashire and Yorkshire hills, the word is used for marshy ground, lying generally in a rather high situation.

"Swinge, to chastise, to beat soundly. Sax. *swingan*, flagellare, castigare."

This verb is accompanied by the notion of *heat,*—a man is said to be *swinged* when he is beaten till he burns. Among the lower classes of Roman Catholics in Lancashire, it is frequently used in reference to purgatory;—"I mun swinge for it in t'other world."

But enough as to words and their meanings. To readers in general, the description of local customs, and allusions to local opinions and superstitions must be more attractive. Thus:—

"Bride-ale, the marriage feast at a rustic wedding. Sax. *bryd eald.*

At every *bride-ale* would he sing and hoppe.
Chaucer,—The Coke's Tale.

The day of marriage has always been, and it is to be hoped—in spite of disconsolate old maids and love-crossed bachelors—will ever continue to be, a time of festivity. Among the rustics in Cumberland it glides away amidst music, dancing, and revelry. Early in the morning, the bridegroom, attended by his friends on horseback, proceeds in a gallop to the house of the bride's father. Having alighted, he salutes her, and then the company breakfast together. This repast concluded, the whole nuptial party depart in cavalcade order towards the church, accompanied by a fiddler, who plays a succession of tunes appropriate to the occasion. Immediately after the performance of the ceremony the company retire to some neighbouring *ale-house*, and many a flowing bumper of home-brewed is quaffed to the health of the happy pair. Animated with this earthly nectar, they set off full speed towards the future residence of the bride, where a handkerchief is presented to the first who arrives. * * Another ancient marriage ceremony of the same sort, still observed in the remote parts of Northumberland, is that of *riding for the kail*, where the party, after kissing the bride, set off at full speed on horseback to the bridegroom's house; the winner of the race receiving the *kail*, or dish of spice broth, as the chief prize.

Four rustic fellows wait the while
To kiss the bride at the church stile;
Then vig'rous mount their felter'd steeds—
—To scourge them going, head and tail,
To win what country call 'the *kail.*'
Chicken's Collier's Wedding."

Again:—

"Death-hearse, an imaginary hearse drawn by headless horses, and driven by a headless driver; if seen about midnight proceeding rapidly, but without noise, towards the church-yard, the death of some considerable person in the parish is sure to happen at no distant period."

The following has more distinctive claims to be considered northern; and to many readers it may be new:—

"Faw, Faw-gang, a general name in Northumberland for all sorts of wandering people, who go about in companies, encamp by the highway sides in summer, and are employed in making and selling besoms and vending crockery ware. Most of them, as remarked by my friend, Mr. Hodgson,

from whose recent history I have adopted the above description, are desperate poachers both in the field and fold-yards. Like the gipsies, the female branches practise palmistry and fortune telling, and deal in various departments of the black art. In Lodge's Illustrations of Brit. Hist. Vol. I. p. 135, is a curious letter from the Justices of Durham to the Earl of Shrewsbury, Lord President of the Council in the North, dated 19th Jan. 1549, concerning the gipsies and *faws*. There was a *Johnnie Faw*, who styled himself Lord and Earl of Little Egypt, with whom that gallant monarch, James IV. of Scotland, found it necessary, or thought it prudent, to enter into a treaty. Queen Mary also granted a writ in his favour. From him and his tribe arose the appellation of *faws*, and *faw-gang*, as applied to this singular race of Border gipsies. In more recent times, old *Will Faw* was king or leader of one of these gangs. Since this was written, it has been suggested that it was probable *Johnnie* derived his name from his tribe, and from the etymon of the word we must refer to the Sax. *fah*, a foe, for they were foes to all around them."

And this:—

"SAINT CUTHBERT'S BEADS, a name given to the *Encrinites* which are found in great abundance among the rocks at Holy Island, and sold to strangers as the attributed workmanship of the Saint. According to the popular tradition, this holy man often visits the shore of Lindisfarne in the night; and sitting on one rock, uses another as his anvil, on which he forges and fashions these beads.

> '*Saint Cuthbert* sits, and toils to frame
> The sea-born *beads* that bear his name.'
> *Scott's Marmion.*

"The *Entrochi* are frequently called *Saint Cuthbert's Beads*, from a vulgar opinion that they were made by that holy man; or because they were used in the rosaries worn by the devotees of that Saint. On the continent they have been known by the name of Mummuli Sancti Bonafacii."—*Ure's Hist. Rutherglen*, p. 319.

They are about the size of the seeds of the mallow, of a dark leaden colour, with a brownish speck in the centre."

"The Virgin's Garland" is not to be found anywhere else so frequently as in the north:—

"VIRGIN'S-GARLAND. Many country churches in the North of England were adorned with these garlands; in token, says Bourne, of esteem and love, and as an emblem of reward in the heavenly Church. They were made of variegated coloured paper, representing flowers, fastened to small sticks crossing each other at the top, and fixed at the bottom by a circular hoop. From the centre was suspended the form of a woman's glove cut in white paper, on which the name and age of the party commemorated by these frail memorials were sometimes written. The custom, once probably very general, of placing flowers in the coffin with the deceased, is still preserved among our villagers. Gay, whose Pastorals represent the real rustic manners of his time, describes most exactly both the virgin's garland and the flower-strewing. 'There is, as remarked by Dr. Drake, something so strikingly emblematic, so delightfully soothing in these old rites, that though the prototype be probably heathen, their disuse is to be regretted. The Romans loved to keep alive the memory of their dead, showing therein a constancy of affection which does them honour; and not only immediately after the funeral, but at stated periods from time to time, they celebrated feasts, and offered sacrifices and libations to them.' 'Perfumes and flowers were also thrown upon the tomb; and the inexpediency of wasting rich wines and precious oils on a cold stone and dead body, when they might be employed in comforting the living, was a favourite subject with the *bons vivans* of the age. It was with the same design to crown it with garlands, and honour it with libations, that Electra and Orestes met and recognized each other at their father's tomb. Roses were in especial request for this service, and lilies also.'—*Pompeii, Vol. II.* Indeed, all nations at different periods, seem to have delighted to deck the graves of their departed relatives with garlands of flowers—emblems at once of beauty and quick fading into death. The Greeks crowned the dead with flowers, and the mourners wore them at the funeral ceremonies."

Mr. Brockett is no more; but his son (the editor of the present edition) bids fair to tread in his footsteps—and has our best wishes.

The Life of Wesley; and Rise and Progress of Methodism. By R. Southey, Esq. L.L.D. Third Edition, with Notes by the late S. T. Coleridge, Esq., and Remarks on the Life and Character of John Wesley, by the late A. Knox, Esq. Edited by the Rev. C. C. Southey, M.A. 2 vols. Longman & Co.

WE have always considered Mr. Southey's 'Life of Wesley' as a remarkable book,—alike distinguished by its faults and merits. Unsatisfactory as it is to both the theologian and the metaphysician, though pronouncing dogmatically on subjects within their special province, still, as a specimen of literary tact and biographical acumen it is entitled to take high rank for research, honest intention, and dialectic ingenuity. The present edition is accompanied by additions calculated to increase its value; since, in the notes of Mr. Coleridge and the remarks of Mr. Knox, both the theological and metaphysical objections to which it is liable are urged on high authority—and so urged as to leave the reader in an unprejudiced state of mind for judging of the evidence for himself and according to his own point of view. It speaks much for Mr. Southey's candour, that it was his own will his work should be re-published with such accompaniments; particularly as respects the notes by Mr. Coleridge;—which sometimes fall with uncommon severity, though always courteously expressed, on the original text. This circumstance is explained by the fact of their not having been written with a view either to publication or to meeting the author's eye. The public has thus, as the editor justly remarks, "at one view the opinions of three men of no ordinary minds upon the life and character of a fourth."

On a blank leaf of Mr. Coleridge's copy of the work was found the following interesting and characteristic

"MEMENTO! It is my desire and request that this work should be presented to its Donor and Author, Robert Southey, after my death. The substance and character of the marginal Annotations will abundantly prove the absence of any such intention in my mind at the time they were written. But it will not be uninteresting to him to know, that the one or the other volume was the book more often in my hands than any other in my ragged book-regiment; and that to this work and to the Life of R. Baxter, I was used to resort whenever sickness and languor made me feel the want of an old friend, of whose company I could never be tired. How many and many an hour of self-oblivion do I owe to this Life of Wesley; and how often have I argued with it, questioned, remonstrated, been peevish, and asked pardon—then again listened, and cried Right! Excellent!—and in yet heavier hours intreated it, as it were, to continue talking to me—for that I heard and listened, and was soothed, though I could make no reply. Ah! that Robert Southey had fulfilled his intention of writing a History of the Monastic Orders—or would become the Biographer at least of Loyola, Xavier, Dominic, and the other remarkable Founders."

The filial editor of these volumes expresses his expectation that, after comparing the author's opinions with those of his two critics, the reader will be inclined to think Mr. Southey's "judgment of Mr. Wesley, on the whole, the most just and the most impartial one." His ground for this expectation is evidently the moderation of Mr. Southey's tone,—which places his judgment almost equidistant from the decisions of his two opposite censors. This remark particularly applies to Mr. Wesley's conduct in relation to the Moravian Brethren. With the latter Mr. Coleridge, as might have been expected, in a great degree sympathizes,—while Mr. Knox manifests decided antipathy to the pious fraternity and its founder. It is not, however, to be hastily inferred that, because an author presents himself as an apparent synthesis between two apparent extremes, he has hit the point of harmony which shall best exemplify the original truth proposed to be illustrated. We believe that Mr. Southey has been far from doing this; and that his critics are equally far from representing the two extremes of opinion which actually in the world are brought to bear on the subject. Mr. Coleridge, indeed, may be accepted as somewhat adequately representing the philosophical public—but Mr. Knox can by no means be accepted as symbolizing the religious. He comes forward rather as the personal friend of Wesley,—and, in some degree, the advocate of the Wesleyans against the Moravians. The religious world requires a more orthodox representative—one of more Catholic sympathies, one as independent of Mr. Wesley and Mr. Southey in theological opinions as Mr. Coleridge was in metaphysical. Such a one would show, we more than suspect, that Mr. Southey's individual conclusions were far more distant from the central point of reconciliation than he himself and his son have evidently supposed. We concede, of course, the impartiality of the biographer's motive, and speak now only of the result.

There are few works in which there is more of unintentional equivocation than in Mr. Southey's 'Life of John Wesley.' This was a blot which could not be concealed from his metaphysical critic; who, accordingly, in more than one of his notes, unreservedly condemns the book as an exceedingly dangerous one to a certain class of students. Writing as Mr. Southey always did from impulse and feeling rather than philosophical system,—and with more of reference to the objectionable doctrine which he desired to attack than to any positive tenet by which it was opposed—we too frequently find him asserting an argument relative to one speculation, which, in relation to another, comes to be virtually, if not expressly, contravened. We have, therefore, to gather his sentiments from a balance of phrases and passages that should be considered rather as so many "moods of the mind" than as parts of a scheme of opinion. On this defect, in reference to Southey's account of the psychological wonders which sometime attended Wesley's preaching—and which the biographer was fond of relating in such biblical terms as this: "Even frenzy was rebuked before him,"—Mr. Coleridge makes in one place this remark:—

"O dear and honoured Southey! this the favourite of my library among many favourites, this the book which I can read for the twentieth time with delight, when I can read nothing else at all; *this* darling book is nevertheless an unsafe book for all of unsettled minds. How many admirable young men do I know or have seen, whose minds would be a shuttlecock between the battledores which the bipartite author keeps in motion! A delightful game between you and your duplicate—and for those like you, harmless. But oh! what other duplicate is there of Robert Southey, but that of his own projection! The same facts and incidents as those recorded in Scripture, and told in the same words—and the workers, alas! in the next page, these are enthusiasts, fanatics; but could this have been avoided, *salvâ veritate?*—Answer. The *manner*, the *way*, might have been avoided."

At times, Southey's argument even attacks the articles of his own professed Faith.—Thus, that "no good works can be done before justification, none which have not in them the nature of sin"—is a doctrine of which he observes that by the Wesleyans it "was not preached in all the

naked absurdity of its consequences." At times, Mr. Coleridge finds that the biographer's reasoning even implies infidelity. For instance, Southey says that the Church could not have effected all the good it has "if it had not employed means which have been too indiscriminately condemned. A religion of rites and ceremonies was as necessary for the rude and ferocious nations which overthrew the Roman empire as for the Israelites when they were brought out of Egypt. Pomp, and wealth, and authority were essential for its success." Whereupon Mr. Coleridge remarks:—

"Many readers, I fear will find a dilemma here. Is Southey a Christian? If he be—nay assuredly he is. But a Christian declare superstitious will worship, with the power, pomps, and vanities of the world, essential to the success of Christianity! But the number and kind of Wicliffe's followers, poor and simple men, falsify the whole scheme."

Mr. Southey was, in fact, too much of an optimist in history;—nor is such a view of the world's story without its attractions. Mr. Coleridge in this, and in some other instances, claimed more freedom. He ventured to believe that events might have happened differently with advantage. Thus, Mr. Southey opines that no "conciliatory measures on the part of the Church could have produced uniformity in a land where old opinions had been torn up by the roots, and the seeds of schism had been scattered everywhere;"—and ascribes historical ignorance to any one who could "imagine" the contrary. Mr. Coleridge says boldly:—

"I *do* not only imagine, but firmly *believe*, that all the *uniformity* requisite for church *unity* might and would have been *obtained*."

While defending his own opinions from the charge of historical ignorance, in more than one place Mr. Coleridge detects Mr. Southey's medical ignorance. Mr. Coleridge had advantages at Mr. Gillman's, and in his acquaintance with Mr. Green, which he was glad to use. Mr. Southey says that, by Wesley's preaching, "paroxysms, even in the sound and sane, were excited which were *new* to pathology." Mr. Coleridge aptly demands, "Whose?"—for that the margin he was annotating, "would not suffice for the names of the authors, with the particular references, who had described the cases and given the physio- and psycho-logical rationale." Mr. Coleridge is himself, however, somewhat inconsistent in ascribing the phenomena to quasi-mesmeric operations,—while, again, he condemns Mesmer himself as a quack. Such, however, are the infirmities even of the wise.

Mr. Knox's weakness, on the other hand, lies in a contrary direction. Mysticism, in physics or metaphysics, has small attractions for him. No terms seem to him severe enough to express his thorough dislike of the character and conduct of Count Zinzendorf. Predicating Wesley's "freedom from every selfish frailty," Mr. Knox naturally enough sees nothing in his separation from his early friends only what was in the line of his duty. "I must even," he adds, "acknowledge that had he acted materially otherwise with respect to Count Zinzendorf and his missionaries, *after becoming acquainted with their real character*, I could not have regarded him in the same morally pure and spotless light in which he has always appeared to me." Again:—

"The native tone of Mr. Wesley's moral nature, heightened, as I have said, by his close and cordial study of the ancient Fathers, and the Anti-Calvinist divines of the Church of England, made it impossible for him to endure the solifidian system in any shape or form, and, least of all, in that gross modification of it, which the disciples of Zinzendorf were anxious to promulgate. * * Besides, it seems to me that no two human minds could have been more opposed to each other, in spirit and habits, than the mind of Count Zinzendorf and that of John Wesley. Count Zinzendorf was specious, artful, and insinuating; and, it would appear, could make out by contrivance what was wanting in fact. John Wesley, on the contrary, wore no disguise; he disdained every shape and form of artifice; and perhaps never was as attentive as he should have been to unite the *wisdom of the serpent* with the *harmlessness of the dove*. They could not, therefore, have gone on together, had their doctrinal disagreement been less essential. But, things being as they were, the concentrated pointing of John Wesley's sternly moral mind, and religiously devoted heart, led him irresistibly to that uncompromising course which he actually pursued. Mr. Southey remarks, that after the formal breach, 'the Moravians forbore from all controversy on the subject: but Wesley did not continue the tone of charity and candour in which he had addressed them upon the separation.' As to the silence of the Moravians, I apprehend, it was only an instance of their general determination. At no time, perhaps, could Count Zinzendorf have satisfactorily explained his measures; and the more his system advanced, the necessity seems to have become greater for avoiding developement. Mr. Wesley, I am persuaded, would have still continued his tone of charity and candour, if fresh grounds of animadversion had not come before him. Mr. Wesley's former intimacy with the Moravians made it impossible for him to escape entire knowledge of those enormities in sentiment, if not in practice, by which Count Zinzendorf scandalized Christianity, and outraged common decency. Mr. Southey, with the most obvious wish not to be unduly severe, justly describes the Count's offensive language and conduct as 'loathsome and impious extravagances.' If the perilous error of this infatuated man be thus revolting to Mr. Southey, in the distant retrospect, with what feelings could Mr. Wesley have regarded it at the moment, but those of indignation and horror? I would also observe, that the instances of discontinued 'charity and candour' which Mr. Southey has adverted to, occurred more than ten years after the formal separation. During that interval the Count had been playing 'such fantastic tricks before high heaven' as astounded all sober-minded Christians throughout Protestant Europe. And though I think Mr. Wesley would have done much better had he passed over the ostentatious parade of titles, where there were such weightier matters of censure, and though I by no means question that it was very injudicious to found general charges on private communications to himself, when so many particulars of a gross and flagrant kind were authentically before the public; yet, considering the general strain of Mr. Wesley's Journal (how far, in itself, allowable or exceptionable, I am not inquiring) and the habitual freedom with which he gives his thoughts of men and things, it would be to me, knowing Mr. Wesley as I did, a matter of wonder, if his strictures on Count Zinzendorf had been less explicit or less emphatical. I have not a doubt that his hatred of the Count's character and conduct was as intense as his own love of purity, 'simplicity, and godly sincerity;' and, circumstanced as he was, and had been, he must have felt, and resented, perhaps more than any other of his contemporaries, the depth and virulence of the scandal. I plead, however for Mr. Wesley's correctness of judgment in few things, either actual or verbal; but I unfeignedly and cordially offer myself as an evidence (perhaps the only impartial one now living) to his utter incapacity of everything 'disingenuous;' to his 'childlike candour,' and to his invincible 'charity.'"

Mr. Knox was little aware, while writing with this degree of partizanship, that a master-mind in his censure of the same work saw the very same circumstances in an entirely different light; and as an impartial observer, detected undeniable traits of ambition and uncharitableness in Mr. Wesley's motives, language, and acts. The same facts are admitted by both; but Mr. Knox justifies them by the sole argument of a reference to his own personal knowledge of the man:—

"It will hardly be denied that, even in this frail and corrupted world, we sometimes meet persons who, in their very mien and aspect, as well as in the whole habit of life, manifest such a stamp and signature of virtue as to make our judgment of them a matter of intuition, rather than a result of continued examination. I never met a human being who came more perfectly within this description than John Wesley. It was impossible to converse with him, I might say, to look at him, without being persuaded, not only that his heart and mind were animated with the purest and most exalted goodness, but that the instinctive bent of his nature accorded so congenially with his Christian principles, as to give a pledge for his practical consistency in which it was impossible not to place confidence."

For an answer to this, it is scarcely necessary to refer to Molière, or any other comic dramatist or delineator of character, to illustrate the kind of influence enjoyed by eminent religious professors over individuals who ignore any amount of evidence against a favourite teacher, in favour of their own prior convictions of his character and their gratitude for the benefits which they believe him to have been the instrument of imparting to themselves. The historian, however, must rigidly adopt the principle that a man is to be judged by his actions—not the actions judged by an *à priori* estimate of the man. In Coleridge's opinion, Mr. Southey was not sufficiently severe. We will group together a few of the notes, which express the opinion of the former on the character of Wesley's mind:—

"I am persuaded that Wesley never rose above the region of logic and strong volition. The moment an idea presents itself to him, his understanding intervenes to eclipse it, and he substitutes a conception by some process of deduction. Nothing is *immediate* to him. Nor could it be otherwise with a mind so ambitious, so constitutionally, if not a commanding yet a *ruling* genius,—i. e. no genius at all, but a height of talent with unusual strength and activity of individual will. * * Here, as everywhere, the predominant *logical* as distinguished and too often *contra*-distinguished from *philosophical*, character of Wesley's mind displays itself. Hence the constant Anthropomorphism in his notions and expressions. Thus in the present instance. I may forgive a man in my thoughts and feelings; and yet not make him know that I have forgiven, nor immediately remove the pain and fear accompanying his ignorance of my forgiveness. But are God's thoughts thus inefficient? Are they not acts? * * The pervading I, I, I, I, disturbs, and makes us think as the Moravians did, and Delamotte."

Coleridge, in particular, owns to a love for Delamotte — whose sentiments generally receive his approbation. On a distinction taken in the correspondence of the former between the simplicity of Wesley and that of a Christian, Coleridge remarks most characteristically:—

"A multivocal word this simplicity. There is a simplicity (so called at least) that consists in *Lininess*, sharp and wiry outline—the simplicity of a skeleton; and there is a simplicity of the complex miracle of flesh and blood, and thousand-fold motion, of a lovely girl of eighteen, or of Eve at her first presentation to Adam. If there be an heterogene from simplicity, the ever-conscious determination to be simple, the *bonice* prepense of simplicity, is it.—But logic, successive volitions, *voluntas perpetua et discontinua* and the first pronoun personal in all its cases, but only in the singular number, ἡμεις being οὐ *αμφ' εμε*—these were Wesley—Boy Wesley, Youth Wesley, Young Man, Man, Elder, Patriarch Wesley: as such he was fitted for his calling; but of whom was this calling? of God? I *cannot* say Yes! I *dare* not, *will* not say or think, No! That Arminian Methodism contains many true Christians God forbid that I should doubt! That it ever made, or tends to make, a Christian I *do* doubt; though, that it has been the occasion, and even cause, of turning thousands from their evil deeds, and that it has made and tends to make bad and mischievous men peaceable and profitable neighbours and citizens, I delight in avowing."

The following note is even wrathful in its righteous indignation:—

"Calmness! decorum! a better! a wiser spirit! Has not Southey given proof that this commencement of Wesley's Epistle was the vilest hypocrisy! that his heart was fermenting with jealousy, and antipathy! that at this very time Wesley regarded the doctrine of the Moravians as the doctrine of devils?"

We might extend this notice greatly—but the annotations of Coleridge, though excellent, are not only abstruse, and suggestive of long trains of arguments to which justice could not be done within any reasonable space, but treat of themes too solemn and sacred for indiscriminate handling. Suffice it to say, that not only has he defended his favourite mystics, but the Puritans also, from the injurious representations of partizan writers. In most of these notes, he has evinced the same sound judgment, with loftiness and freedom of mind, by which he is remarkably distinguished among the writers of his period. We cannot but regret that, with his extended and elevated views, Coleridge did not himself write some such biographies as the one before us;—but the labour of compilation was not congenial to his abstract originality of mind. The judicial function suited him better than that of the advocate.

OUR LIBRARY TABLE.

A Selection from Lord Chesterfield's Letters to his Son, on Education. Embracing the most appropriate Passages, prepared for Translation into French. By Isidore Brasseur.—The design of this little book may be best stated in the author's own words:—"The importance of an elementary book which may facilitate the work of translation from English into French, and enable the scholar more fully to comprehend his task, is so obvious, that no British Scholastic Institution can be indifferent to its advantages; much more, then, will its utility be appreciated in places in which the study of the elegant idiom of Buffon forms an important feature in the education of young men. The want of such an auxiliary to guide the progressive stages of instruction has been long felt with regret. Professors have, therefore, in the interim, been divided between the alternative of placing in the hands of their pupils such compositions as the *Spectator* and the like difficult works, or of substituting, in their stead, English *translations* from the French, designed, it is true, to assist, and not to hamper their progress. But both methods will, on reflection, be found equally inadequate to the purpose intended. In the former, the learner has to contend with greater difficulties than he can master, and in his struggles, he is left to his own unassisted resources; and in the latter, very little advantage can accrue to the pupil, since it is not by merely *retranslating* English *versions* into the original French, but by translating in Idiomatic French (of course with the help of notes) the peculiar expressions of *genuine* English, that his mind may be impressed with the frequent difference in the construction of the two languages." The design is a good one, and well supported by the execution. The choice of a writer need not perhaps be objected to—the style of Lord Chesterfield's Letters having been justly described as "clear, elegant, and terse, never straining at effect, and yet never hurried into carelessness." Nor is the matter so ill calculated to instruct the young as is by many supposed. Even Johnson observes that, "take away the immorality, and the book should be put into the hands of every young gentleman." The rules for the conduct of life—especially of early life—are often admirable,—unrivalled for knowledge of the world and of its indispensable business. Still, with all these recommendations of style and matter, Lord Chesterfield's work is not the best choice that might have been made. Despite his shrewdness, and consummate acquaintance with manners, he is often frivolous—and frivolous, too, in spite of his own judgment. If M. Brasseur should think it necessary to extend the execution of his design by further publications, we should recommend to him some of Cowper's Letters.

The Picturesque Hand-Book of Liverpool.—A new edition of a useful work,—containing some fresh information deserving of notice. It includes the recent improvements in the town of Liverpool and its environs; and a particular description of Birkenhead,—which has now risen to independence and importance. The rise of Liverpool is considered to have been rapid,—but that of Birkenhead has been far more so. In the year 1818, it contained only some half dozen dwellings, with a population of about fifty:—now, the inhabitants number about 18,000. So great is the annual increase that the writer states "certainly not far distant is the day when we may expect to compute the population of Birkenhead at a good round hundred thousand." The book is profusely illustrated, and pleasingly written.

Early Influences.—The title sufficiently explains that this is one of those little educational books which are now so numerous. The meanest of these, being well intended, may have its utility;—the present is certainly not without merit.

Outlines of Mental and Moral Science.—This is a book intended as introductory to the Dublin University Metaphysical Course. Unfortunately, like most of its class, it is a one-sided compilation; ignoring all but the Scotch school of philosophy. This mode of treating the subject is no longer sufficient; and will not be held satisfactory by the dullest student who has once obtained some intimation that there is a world beyond it, richer in promise and more successful in discovery. So far as the compiler's knowledge extends he has got up his work with care and pains; concluding it with a 'Lexicon,'—which is not without its value, though just objections may be taken to some of the definitions.

British Consuls Abroad. By R. Finn, Esq.—A work professing, on personal observation, to explain the present consular system:—and claiming to be the first on the subject. The office, formerly ill-appointed, and liable to much abuse, has, we are told, been lately beneficially modified.

Cleaver's Parliamentary Elections Register.—Tables for containing the particulars, and deducing the results of a general election; or the state of parties in the House of Commons of any period. They will be found convenient to the politician.

John Bull's Trip.—A humorous medium for learning to converse in French during a trip to Boulogne and Calais; together with some directions for the tourist.

Outlines of the History of France. By the Rev. O. Cockayne.—The history of France is, here, reduced to some hundred and fifty small pages,—told as clearly as might be expected in so compressed a form; and its different parts are arranged with judgment.

Hints on Husband-catching; or, a Manual for Marriageable Misses.—A satirical essay, that might easily have been more clever. The writer's irony does not always tell; and the design would have been a gainer by greater elegance of style. Even then, however, the vulgarity of feeling and purpose would have condemned the book.

LIST OF NEW BOOKS.

Anthon's Horace, with Notes and Index, 9th edit. 12mo. 7s. 6d. cl.
Abbotsford Waverley, half Vol. XXI. 'Fair Maid of Perth,' roy. 8vo. 15s. cl.; ditto, Half Vol. XXII. 'Anne of Geierstein,' 15s. cl.
Baker's (Rev. T. B.) Christ, the Man of Sorrows, 12mo. 5s. 6d. cl.
Bohn's Standard Library, Vol. XI. Beckmann's 'History of Inventions,' Vol. II. post 8vo. 3s. 6d. cl.
Book for Wives and Mothers, 18mo. 6d. swd.; 1s. cl.
Brasseur's Chesterfield's Letters, for translation into French, 3s. 6d.
Cabinet Lawyer (The), 13th ed. corrected to present time, 10s. 6d. cl.
Channing's (Dr. W. E.) Entire Works, 2 vols. 8vo. 8s. cl.
Dickens's (C.) Pictures from Italy, new edit. 6s. cl.
Huntingdon's (J. B.) Tables and Rules for Earthwork, Land, &c. crown 8vo. 18s. cl.
Jagoe's (J.) Practice of the Courts for the Recovery of Small Debts in England, 12mo. 4s. 6d. bds.
Lake (The), and other Poems, fc. 8vo. 5s. cl.
Lowe's (Rev. J. B.) Annual Festivals of the Jews, fc. 8vo. 2s. 6d. cl.
Mary Anne Wellington, the Soldier's Daughter, Wife, and Widow, by the Rev. R. Cobbold, 3 vols. post 8vo. 31s. 6d. cl.
Mayo's Model Lessons for Infant Schools, Part I. 3rd ed. 3s. cl.
New English Spelling Book, 12mo. 1s. cl.
Nemesis in China (The), from the Notes of Capt. W. H. Hall, R.N., 3rd edit. crown 8vo. 12s. cl.
Oliver Twist, by C. Dickens, new edit. illustrated by G. Cruikshank, 1 vol. 8vo. 11s. cl.
Paterson's (W.) Small Debts Act, (Law Times edit.) 12mo. 4s. bds.
Paget's (F. E.) Hope of the Katzekopfs, (Juv. Eng. Lib.) 18mo. 2s. 6d.
Parlour Novelist, Vol. X. 'Dark Lady of Doona,' by W. H. Maxwell, 12mo. 2s. swd.; 2s. 6d. cl.
Rogers's (Rev. G. A.) Bethany; or, Christian Experience Unfolded, 12mo. 5s. cl.
Roscoe's Edition of the Battles of England, royal 8vo. 4s. cl.
Sharpe's London Magazine, Vol. II. royal 8vo. 4s. 6d. cl.
Sherwood's Indian Pilgrim, 12mo. new edit. 3s. 6d. cl.
Sir Frizzle Pumpkin, Nights at Mess, and other Tales, fc. 8vo. 2s. 6d.
Slade's (Rev. J.) Parochial Sermons, Vol. III. 3rd ed. 12mo. 6s. bds.
Switzerland and the Swiss Churches, by W. L. Alexander, D.D. 5s.
Tredgold on the Strength of Cast Iron, &c. Part II. 8vo. 12s. bds.
Smith's (Dr.) Manual of Theology, 4th edit. 12mo. 8s. 6d. bds.
Valerius, a Roman Story, new ed. fc. 8vo. 2s. 6d. swd.; 3s. cl.
Vidal's (Mrs.) Tales for the Bush, 3rd ed. 16mo. 5s. cl.
Warren's (Mrs.) Point Lace Crochet Collar Book, with Original Patterns, square 32mo. 6d. swd. gilt.
Woolley's (J.) Introduction to Logic, 12mo. 2s. 6d. cl.

SOME WE HAVE MET.

Oh, fair to the exile may rise the home faces
That smile on his slumbers and light up his dreams,—
The lost and the parted, who leave their lone traces
In memory mirrored, as stars in deep streams;
Yet are there not hours when the march of existence
Grows faint with a vain and a voiceless regret
For scenes which the pilgrim still marks in the distance,
More bright with the glances of some we have met?

They may be the gifted, whose voices were sent us
Like music to mingle with life's morning air;—
Oh! well if the Memnon of memory present us
But half the rich burthen that song used to bear!
We may meet but their fame in the few years before us,
Like light on the hills where our planet hath set;—
Yet fair will it rise through Time's shades, to restore us
A dream of their presence whom once we have met.

They may be the world's unremembered and fameless,
Who spake to our souls, in the days of their strife,
Some lesson of wisdom—the blest and the blameless—
Like precious seed sown by the way-side of life:
Unmarked it may fall, though a treasure outweighing
The glory we sought and have conquered,—but yet,
Though the soil may be fruitless, how richly repaying
The sower with blessings—on some we have met!

Perchance it was ours, on life's journey, to enter
Some path through whose shadows no love-light was thrown,
With heart that could breast the fierce storms of its winter,
And gather the wealth of its harvests alone:—
It is well there are stars in bright heaven to guide us
To heights we ne'er dreamed of;—but, oh! to forget
The fortunes that bar and the gulfs that divide us
From paths that looked lovely—with some we have met.

And yet, when some long-after summer is lending
Its dew to our graves and its light to the hours
That shadow the peace of their calm years, descending
'Mid home ties and pleasures that never were ours,—
Oh! then, should some tone which our hearts left behind them
Arise by their hearths, they will tell of us yet
As those who have passed where no tempest can find them,
Unmissed and unmourned but—by those we have met.

How few are the memories of life's many meetings!—
How seldom they come that are pined for so sore!
There was light in their smiles—there was joy in their greetings—
But the stream bore us on, and we saw them no more:—
Yet many bright steps of our after-sojourning,
And many true records of love's blessed debt,
Oh! never, like "bread on the waters," returning,
Have been but in memory of some we have met!

Stranorlar. FRANCES BROWN.

WORDS.

What are words but little sprites,
That flit the world about,—
Stealing every thinker's thought
And fitful fancy out;
Shaping every wild conceit,
And prejudice, and doubt?

Stately, sprightly, solemn, gay,
Thousand shapes they wear,—
Graceful, grim, uncouth, sedate,
From lip to lip they fare,—
Joy's, Hope's, Invention's harbingers,
Or heralds of Despair.

Round about the world they go,
Seeking where to dwell;
Frolicking in Echo's haunts,
Hiding in a shell;
Floating sometimes on the wave,
From the passing bell.

Law imprisons many a one
In her parchments old;
Priestcraft tortures until they
A double sense unfold;
Tyrants and traitors mangle them,
And misers too—for gold.

Blindly in the sophist's nest
Hosts all heedless run;
Wit entraps as many more,—
Martyrs them in fun;
Music with seductive sound
Melteth them in one.

Scribes there are who bid the sprites
In their cause engage,
Fenced about all cunningly
Upon a printed page,—
Messengers of good or ill
To every coming age.

Rainbow-winged, in sunny light,
From maiden's lip they glide,—
Laden, from the lover's heart
Like honey-bees they sli[illegible] —
Strong and stern, they be[illegible] aloft
Philosophy in pride!

From the poet's pen they flash
Lightning-like and strange,—
Through the world of human hearts
With him, too, they range:
Blessèd all they look upon—
Suffers nought of change.

Round the Prophet of the True
Soar they, shapes of good!
Chasing dismal mists that shroud
Life's deep inner flood,—
Show it pouring ever down,
Glory-lit, from God.

Representatives of Thought,
Essence of the Ideal,
Oft, oh words! your majesty,
Your power sublime we feel,—
Leading Man by purity
Upwards to the Real.

W.

FLOWER DIRGES.

Sing ye dirges for the flowers?
Nay,—their prime is past and gone;
Fed with sunshine and sweet showers,
They have graced the summer hours,—
Now, their work is done:
From the uplands, fierce and strong,
Bitter blasts will blow ere long—
Happy they, secure of shelter
From wild Winter's wrong!
They have left us, undismayed
By the change that did befall;
Wearied out with shine and shade,
It rejoiced them, one and all,
To escape from daylight's ken
To their chambers subterrain,—
There to rest awhile, and then
Wear their summer robes again,
Weave them fresh, and weave them fair,
And their fragrant spells prepare:—
Therefore, sing no mournful dirges, for these flowers,
O men!

But, if ye *must* sing, sad-hearted,
Thus, your withered joys among,
Wail ye for the hopes departed
Since the year was young.—
For the hopes that, bright and glowing,
Sprang beside the rivers flowing
Through the land of thought erewhile,—
Sprang, soul-nurtured, and grew lovely
In Faith's halcyon smile,
Till the world's breath reached them:—slowly
Then ye felt their beauty wane;
One by one, they vanished wholly
Into Death's domain.—
Fading, not, like Earth's pale blossoms,
Soon perchance to bloom again.
For high hopes, then, lowly lying,—
Meek hopes, once so fair to see,—
Loving hopes, all coldly dying,—
Heavenward hopes—ah, me!
Sing ye dirges, deep in sadness, for *these* flowers,
O men!

J. WESTWOOD.

FOLK-LORE.

Medical Superstitions.

The Ash Tree.—It may not be uninteresting to many of your readers to learn that, in the year 1833, I witnessed, at Shaugh, on the borders of Dartmoor, the actual ceremony of drawing a child through a cleft ash tree for the cure of rickets. The tree, which was a young one, was not split through its whole length,—a large knife was inserted about a foot from the ground, and the tree cut through for a length of about three feet. This incision being thus made, two men drew the parts forcibly asunder, until there was room enough to draw the child through,—which was done by the mother three times. This, however, as I remember, was not alone considered effective—it was necessary that the child should be washed for three successive mornings in the dew from the leaves of the "charmed tree." Something similar to this is required in Cornwall, before the ceremony of drawing a child through the "holed stones" is thought to be of any virtue. It is not difficult to understand that the exposure of the infant to the genial influences of the morning air, and the washing which is also required, may, in some cases, give rise to an improved condition in the health of the child,—which has been, no doubt, often attributed to the influence of the ash tree and the holed stone.

Charms for the Hooping Cough.—Whilst on the subject of medical superstitions, I might also state, as having come under my own knowledge, the process of drawing children three times over the back and under the belly of an ass, three years old, for the cure of the hooping cough. This having been done, three hairs were pulled out of the animal; and these were boiled in three table spoonfuls of milk, and the milk was then administered to the little patient for three mornings. This curious custom,—which appeared to be associated with an idea of the sacred character of the ass, derived from Christ having rode on one into Jerusalem,—was practised about eight years since, in the parish of Ludgvan, near Penzance; and I had, from the old woman who officiated in these mysteries, a very detailed account of cures performed by her in this way. H.

The popular belief as to the origin of the mark across the back of the ass, is mentioned by Sir Thomas Browne, in his 'Vulgar Errors,' [see Sir H. Ellis's edition of 'Brand's Popular Antiquities,' vol. iii. p. 195;]—and, from whatever cause it may have arisen, it is certain that the hairs taken from the part of the animal so marked are held in high estimation as a cure for the hooping cough. In this metropolis, at least so lately as 1842, an elderly lady advised a friend who had a child dangerously ill with that complaint, to procure three such hairs, and hang them round the neck of the sufferer in a muslin bag. It was added, that the animal from whom the hairs are taken for this purpose is never worth anything afterwards,—and, consequently, great difficulty would be experienced in procuring them; and, further, that it was essential to the success of the charm, that the sex of the animal from whom the hairs were to be procured should be the contrary to that of the party to be cured by them.

Fairy and Ghost Lore.

Lower Wick, near Gloucester.

Your correspondent, Mr. Ambrose Merton, in his letter, which appeared in p. 886 of the *Athenæum* of the 29th of August last, in speaking of Derbyshire, says "is not the neighbourhood of Haddon, or of Hardwicke, or of both, still visited by the coach drawn by headless steeds, driven by a coachman as headless as themselves? Does not such an equipage still haunt the mansion of Parsloes, in Essex?" Now, whether those places are still supposed to be so haunted I cannot say,—but I well remember that in my juvenile days old people used to speak of a spectre that formerly appeared in the parish of Leigh, in this county, whom they called "Old Coles;" and said that he frequently used, at dead of night, to ride as swift as the wind down that part of the public road between Bransford and Brocamin, called Leigh Walk, in a coach drawn by four horses, with fire flying out of their nostrils,—and that they invariably dashed right over the great barn at Leigh Court, and then on into the river Teme. It was likewise said, that this perturbed spirit was at length *laid* in a neighbouring pool by twelve parsons, at dead of night, by the light of an inch of candle; and as he was not to rise again until the candle was quite burnt out, it was, therefore, thrown into the pool, and to make all sure the pool was filled up—

And peaceful after slept Old Coles's shade.

Now, as this legend belongs to ghost, instead of fairy, lore—and as the scene of action was not in a reputed fairy locality—I, therefore, did not notice it in my little work 'On the Ignis Fatuus; or, Will-o'-the-Wisp and the Fairies:'—but it appears to be of kin to those mentioned by your correspondent.

Upon my lately considering the tenor of this legend, I was led to think that "Old Coles" must have been a person of some quality; and it induced me to look into Nash's 'History of Worcestershire,' hoping it might throw some light upon the subject. Therein, in his account of Leigh (Vol. II. p. 73), the author says "This ancient lordship of the abbots of Pershore falling by the dissolution of monasteries into the king's hands, remained there till Elizabeth's time. The tenants of the house and demesne, both under the abbot and under the king and queen, were the Colles, of which family was Mr. Edward [Edmund] Colles*, 'a grave and learned justice of this shire, who purchased the inheritance of this manor,' whose son, William Colles,† succeeded him, whose son and heir, Mr. Edmund Colles, lived in the time of Mr. Habingdon, and being loaded with debts (which like a snow-ball from Malvern Hill gathered increase) thought fit to sell it to Sir Walter Devereux, Bart."

The Colles's were also possessed of the manor of Suckley‡, which adjoins Leigh; and it shared the same fate,—as appears by Nash's History, vol. ii. p. 397—as follows:—

"The manor of Suckley remained in the name of Hungerford till it passed, by purchase, from them to Mr. Edmund Colles, of Leigh, in the reign of Elizabeth. He left it to his son, Mr. William Colles; whose heir, Mr. Edmund Colles, sold it to Sir Walter Devereux, knight and baronet."

Now, it is not improbable that the legend may have referred to the unfortunate Edmund Colles the second, who having lost his patrimony and, perhaps, died in distress, his spirit may have been supposed to have haunted Leigh Court,—which was the seat of his joys in prosperity and the object of his regrets in adversity.

Your correspondent also inquires, "Are there no records of a fairy pipe-manufactory to be gathered at Swinborne, in Worcestershire?" Now, I cannot find that there is such a place in this county; but I well recollect that in my early days the ceremony noticed in your Number of the 12th inst., namely—

Out 'ettle
In dock, &c.

was practised by the peasant children of this county when they happened to be stung by nettles.

JABEZ ALLIES.

[We have reason to suspect that "Swinborne in Worcestershire" was an error of our correspondent,—and should have been "Swindon, Wiltshire."]

Charm for an Evil Eye.

Your interesting papers upon 'Folk-Lore' have brought to my recollection a number of practices common in the West of Scotland. The first is a test for, or a charm to prevent, an "*ill e'e.*" Any individual ailing, not sufficiently for the case to be considered serious, but lingering, is deemed to be the object of "an *ill e'e*" of some one "*that's no canny.*" The following operation is then performed:—An *old* sixpence is borrowed from some neighbour, without telling the object to which it is to be applied; as much salt as can be lifted upon the sixpence is put into a table spoonful of water and melted; the sixpence is then put into the solution, and the soles of the feet and palms of the hands of the patient are moistened three times with the salt water; it is then tasted three times, and the patient afterwards "*scored aboon the breath,*"—that is, by the operator dipping the forefinger into the salt water and drawing it along the brow. When this is done, the contents of the spoon are thrown behind and right over the fire,—the thrower saying, at the same time, "Lord preserve us frae a' scathe!" If recovery follow this, there is no doubt of the individual having been under the influence of an evil eye.

There are, also, processes for detecting the persons who are exercising the evil eye,—and causing their own wishes to revert, for a time, on themselves;—which may be subjects for another notice. I may mention, however, a practice,—the object of which I never could learn,—which I have witnessed in the country. When a dead body is laid out, a small plate filled with salt is placed upon the breast of the corse.

J. B. N.

The salt was, doubtless, originally used, on the me-

* He died 19th December, 1606, aged 76.
† Died 20th September, 1615. See Nash's account of the family monuments in Leigh Church.
‡ This manor includes the hamlets of Alfrick and Lulsley. There is a farm called Colles Place (*vulgo* Coles Place, or Cold Place) in Lulsley, "which is mentioned in a ledger of the Priory of Malvern, in the reign of Henry III., as belonging to the family of Colles." See Nash, vol. ii. p. 400.

luncholy occasions referred to by our correspondent, as a charm to protect the deceased from witches and evil spirits. It is a common superstition, we believe, in Germany, at the present day, that he who has bread and salt about him cannot be injured by witches;—and we learn from Grimm's 'Deutsches Rechts-Altherthumer' that it was a custom formerly to place salt beside an infant before it was baptized, as a protection from evil influences.

AURORAL ARCH.

Esk, near Durham, Sept. 22.

On the evening of Monday, Sept. 21, there was observed, at Esk, about six miles west-north-west of Durham, a brilliant, but very brief, display of an Auroral Arch. The evening of the equinox being a period at which meteorologists are usually on the alert, I am induced to state the particulars,—that they may be compared with any observations of the phenomenon which may have been made in other places.

At a few minutes past 8 in the evening, the whole of the northern part of the sky was illuminated with a clear auroral light, from behind a bank, not of the usual horizontal kind, but formed of rather heavy cumulous clouds. In the north-east there was a broad beam of nebulous light, rising from near the horizon, not quite vertically, but pointed towards the south of the zenith. It presented a tremulous, diffused, cloud-like appearance,—and extended to an elevation of 12° or 15°.

At 8h 11m, mean Greenwich time, this beam suddenly extended itself, with a rapid flickering motion, into an arch spanning the heavens from north-east to south-west. The light of the arch was very variable: the colour purely white; and the whole so perfectly transparent, that the stars, then shining brilliantly, were distinctly seen through every part of it. Its breadth was, on the average, about 5°.

The arch sprang, in the north-east from a part of the heavens about 25° north of east, and extended in the east towards a point about 25° south of west. Its greatest elevation was 65° or 70°, in its middle point, at about 25° east of south. This general direction was determined by its position in reference to some principal stars. It passed somewhat northward of the stars in the head of Aries, across the principal stars of Cygnus,—leaving Lyra to the north and the three bright stars in Aquila to the south.

As the deviation of the magnetic needle in this place is about 26° 30′, and the dip about 69°, it will be perceived that the direction of this arch was nearly a great circle, cutting the horizon at the magnetic east and west points, and passing nearly through the point in the heavens to which the southern pole of the dipping needle is directed. If the arch should have been observed elsewhere, it would be desirable to know its direction and elevation. Unless the height of the arch above the earth's surface were much greater than that usually assigned to such phenomena, its angular elevation, as here observed, so nearly agreeing with that of the dipping needle, must be an accident arising from local position.

The time during which the arch was, here, visible did not exceed five minutes. The arch faded at the western end first; and in a few minutes all trace of it had disappeared.

Almost immediately afterwards, the sky, which had been perfectly clear, was covered with a thin layer of vapour, except towards the north,—where the appearance of the Aurora Borealis remained for several hours; but without any streamers. The wind was very light from the eastward; the barometer 29·09 inches,—the elevation of the place above the level of the sea being 700 feet; the thermometer about 50°, (the minimum of the night being 47°). The latitude of the place of observation 54° 47′, and the longitude 0′ 44″ west of Greenwich. This arch, in its general appearance, and especially in its position with reference to the magnetic meridian, closely resembled that observed by Mr. M'Farlane at Comrie in Perthshire, on the 27th of August last,—as recorded in the *Athenæum* of Sept. 5: but its duration was much shorter. TEMPLE CHEVALLIER.

GREAT BAROMETRIC WAVE.

Sept. 23.

Allow me through the medium of your columns to invite the attention of meteorologists to the Great Symmetrical Barometric Wave of November. The notice of this interesting phenomenon, including instructions for observing it, which you kindly inserted in the *Athenæum* of September 6, 1845, was productive of several interesting and valuable sets of observations; and the results deduced from these observations are highly important. During the last autumn, the wave returned and exhibited all its essential features. These results were reported to the British Association at its recent Meeting,—as mentioned in your notice; and I have been requested by that body to procure a repetition of the observations during the present autumn, and report on them at its next Meeting, to be held at Oxford. Any gentleman interested in meteorological research, and feeling desirous of taking part in the observations to be made during the ensuing two months, may obtain the necessary instructions and forms, with any further information he may desire, by addressing a line to me on the subject;—and all observations that may be made in accordance with such instructions, and forwarded to me, will be carefully examined and reported on at the next Meeting of the British Association.

W. R. BIRT.

OUR WEEKLY GOSSIP.

We direct attention to the speech of Mr. Lyell, reported, this day, in our account of the proceedings at the Meeting of the British Association, for the purpose of at once correcting the misrepresentation conveyed by the reports of certain other journals. By these deponents, Mr. Lyell is made to lament the differences of opinion existing amongst geologists—by means of the very paragraphs in which he congratulates science on their complete unanimity. It is directly asserted by Mr. Lyell, that with such rapidity has the progress of conviction made its way before the impressive language of structural testimony, that truths to which a large body of the scientific world refused even a hearing not very many years ago, have now the verdict, without a dissentient voice at home or abroad, of scientific men. This assertion is delivered in the presence of a congress which may fairly be said to represent the body of European Science—and to acquiesce, in its name: and it is rather hard that a manifesto of the kind should be reported into a lamentation over the differences of opinion by which that body is divided. The manner in which that hurried and very illogical gentleman, The Reporter, has stumbled upon his false inference in this case, may be explained without a necessary impeachment of his intentions in the matter—but not without damaging his authenticity as a recorder. Mr. Lyell contrasts the universal conviction of the scientific mind on the subject of which he speaks with the very general resistance of the public and uneducated mind—"laments the discordance between the opinions of scientific men and the great mass of the community." The Reporter, it will be seen, has only, by a trick of his art, to leave out the concluding half of this sentence, and the conversion of meaning is at once effected, to suit a purpose, or record a blunder. It is astonishing how much a Reporter may do in this way, by skilful management of his instrument—yet seem an honest man and a fair witness all the time. Elision is a prodigious lever in his hands—and punctuation itself a powerful thing to conjure with. A mere comma may be so manœuvred as to turn a truth backwards. His is a fairy gift for turning men's white into black before their faces,—changing the very diamonds that issue from their mouths into toads as they fall. As we have said, the power may have been unconsciously exercised on the present occasion; for men who habitually wear a ring by which the Genius of Untruth may be summoned at will, are liable to make accidental proof of its virtue on all things with which they come in contact. The philosophers may be left to maintain their argument against those who honestly dispute it as best they can; and, if the argument be good, it need not fear that honest opposition:—but it is fit that some one should step in to prevent their being made unwillingly to testify against themselves. The cause of Science must not, at any rate, be sacrificed to an ingenious perversion of that idea of a Temple of Truth, wherein men, while intending to speak the language of subterfuge, are made to utter unconsciously their secret thoughts. Mr. Lyell is not, while delivering the truth of his opinions, to have them voiced into their direct opposites.

The third Anniversary of the Ray Society was held during the meeting of the British Association, at Southampton,—Prof. Bell, the president, in the chair. The Secretary, Dr. Lankester, read the Report; which stated that, since the last meeting, the six works for the two first years' subscription had been issued; and that the first volume for the third year, 'Meyer's Geography of Plants,' was now ready for distribution. The two other volumes for the third year, 'Burmeister on the Organization of Trilobites,' and the third part of Alder and Hancock's great work on the 'British Nudibranchiate Mollusca,' were preparing,—and would be distributed before the end of the year. Several other works were announced as in preparation;—amongst them, Prof. Agassiz's 'Bibliotheca Zoologica et Palæontologica,' Ray's unpublished 'Letters,' Linnæus's 'Travels,' and Azara's 'Natural History of Paraguay.' The increase in the number of members since the last anniversary was above 150. The Society numbers now nearly 1,000. Prof. Agassiz, in moving one of the resolutions, spoke strongly in favour of the value of the works already published by the Society.

The announcements are out for the grand annual performance of the Manchester Athenæum—Lord Morpeth being engaged to play the leading part of President. Other stars are advertised; and scenic properties and theatrical accommodations are in preparation. The members of the institution, as usual, give up their stage to the London performers—descending, themselves, into the characters of candle-snuffers and scene-shifters. Seriously, there is in all this something so much at variance with the practical good sense which is the spirit of the modern movement—so largely contributed to by Manchester—it is such a return upon the Fantastic and Fictitious which it is a very object of institutions like this to discredit and dislodge, that we cannot withhold our annual protest. This paper has maintained too long a fight for all establishments having objects like those of the Manchester Athenæum, to be liable to any suspicion of unfriendly motive when it denounces the attempt to seek the support of those objects in foreign flatteries, and the folly of seeking character, or seeing utility in a mere display of travelling orators.

The space cleared away, some twelve months since, to make room for the erection—as in a sanguine moment it was pretended—of a Museum of Economic Geology, is still—a space, "and nothing more." It is difficult to account for the sort of paralysis which falls on so many of our public undertakings that seemed to have a vigorous birth, save by the explanation of an architectural epidemic. A correspondent proposes another reason, in the present case. He suggests that the work may be awaiting the completion of the Nelson Monument, to obtain the use of the one man and boy whom *Punch's* testimonials have recommended for the sort of employment. *The Builder* gives, as the result of its inquiries on the subject, a statement, according to which the reversion of the man and boy is sufficient for all present probabilities. "Plans," says that paper, "were prepared, but, not meeting entire approval, were sent back; as we are told, for alteration. A new administration has since come into power; and, up to this moment, we believe, nothing precise is determined on in respect of the proposed building."

In the year 1841, the Mechanics' Institution, and similar bodies in London and the country, determined to open a subscription for the purpose of commemorating the services rendered by Dr. Birkbeck to the cause of Education; and at a public meeting, held in 1842, it was resolved that any fund so subscribed should be devoted to founding, in University College, London, a Professorship of Machinery and Manufactures, to be called the Birkbeck Professorship. It was estimated that the sum required for endowing such a Professorship would be 1,500*l*. The subscriptions, however, did not exceed 500*l*.—and the design was abandoned. The Council of the College having recently erected a laboratory for practical instruction in organic and general che-

mistry, and the principles of chemical research as applied, more particularly, to the manufacturing arts, it was thought that this laboratory would constitute an appropriate testimonial to Dr. Birkbeck, under the title of the "Birkbeck Laboratory of Chemistry;" especially if an evening course of instruction in practical chemistry, at a reduced fee and at times suited to the convenience of persons practically engaged in manufactures, could be connected with it. It has been decided, accordingly, that the laboratory shall be so named and inscribed, and the course of instruction instituted; and the amount of subscription already received for the testimonial has, with the consent of the subscribers, been paid over to the Council of the College. It has also been agreed that the committee of subscribers shall co-operate with the council in an appeal to the public for further contributions towards the twofold object of an acknowledgment of the services of Dr. Birkbeck, and promoting a most useful scientific institution—the cost of the laboratory alone exceeding 2,500*l.*

We understand that the widow of the late Mr. Banim has been placed on the Pension List, for an annuity of 50*l.*

Letters from Genoa state that the King of Sardinia was expected to be present at the Scientific Congress of that city.—At Turin three new professorships have been created,—in Public and International Law, Administrative Law, and Political Economy.

Among our foreign gossip we may mention a statement that Luther's original letter to the Archbishop of Magdeburg, protesting against the sale of Indulgences—dated Oct. 31, 1517—has been discovered at Stockholm.

We hear, from Vienna, that the excavations and works for clearing out Salona in Dalmatia, the residence of Diocletian, which were commenced in the year 1821, and abandoned in 1828, were resumed in the early part of the present year, and are now prosecuting under the direction of a commission named by the Government.—And from Berlin, that the King of Prussia has created a chair of Egyptian Archæology at the university in that city; and appointed to the professorship M. Lepsius, the well known chief of the scientific expedition into Egypt and Nubia.

The principle of international copyright, so long and earnestly urged in the columns of the *Athenæum*, is gradually making its way among the nations—having already in some of the European States received a formal recognition, and obtained a theoretic one in nearly all. In America, we are told, the current of opinion—even commercial opinion—is now setting strongly in the same direction, and many signs point to an early treaty. Practically, the publishers, themselves,—who not many years ago were pirates as systematic and avowed as the Belgians,—have anticipated the Congress in the reception of the doctrine; having, we are informed, come to an understanding amongst themselves that it will be for their interest, as well as a measure of justice, to purchase from a foreign author the privilege of publishing "*in perpetuo* in the United States—allowing him as his share a portion of the profits." Already, "this arrangement has been made more than once, and is growing to be a custom of the trade."—While speaking of international copyright, we may mention that the Commissioners of the Customs have received a communication from the Secretary of the Treasury, calling their attention to the 5th article of the Prussian treaty, with respect to the stamping of books intended for exportation to the United Kingdom. It is desired that, in carrying into effect the Orders in Council transmitted to the Customs on the 3rd inst., they will instruct their officers to admit, on the scale of duties specified in the schedule of the Act of last session, cap. 58, all such books as may be stamped in the manner agreed upon in the above article, and to transmit to them, for their information, patterns of the stamps which have been forwarded by the Prussian Government for that purpose. Copies of this order of the Lords of the Treasury, issued in compliance with and by direction of the last paragraph in the Orders in Council affecting the matter, with patterns of the stamps alluded to, have been furnished to the revenue officers in London, and the collectors and comptrollers of the Customs at the several outports of the kingdom, for their information and government in carrying the convention into effect.

MEETINGS FOR THE ENSUING WEEK.

THUR. Zoological Society, 3.—General Business.
FRI. Botanical Society, 8.

1848

FINE ARTS

ART IN HOLLAND.

The Hague, Sept.

I cannot avoid the idea that an artistic tourist, as catholic in spirit as those who have effected so much for the historical knowledge of Religious Painting in Italy, is wanted for Holland: not merely to do justice to a very remarkable school of contemporary painters, but to reconsider the wisdom of the *cognoscenti*, which was too apt to narrow itself within a circle of favourite epithets;—*Dutch* Art standing for something gross, unintellectual, and *porcine*, to quote a word from an ingenious 'Theory of Beauty and Deformity.'* Now, without presuming to raise my voice against the definition as generally unjust, I would have some one visit the glorious collections at the Hague and Amsterdam, who should be able to rate the exceptional specimens according to their own value, and not by the ready-made standard of disdain—alike ungenerous whether it exhibit its cynicism by the Arno's side or on the banks of a canal bordered by Paul Potter trees. With a view to turning the attention of the qualified this way, I send you a few fancies, on matters which I do not recollect to have seen touched upon.

I could begin, in the royal collection, with Hemlink's history-pictures of the life and deeds of Saint Bertin,—his Birth of St. John,—and his portable altar of Charles the Fifth; both of the latter bordered by Gothic tabernacle work, with niched saints *en grisaille*, of their kind, nearly as grand in design as Peter Visscher's Apostles on the shrine of St. Sebald at Nuremburg. And, calling attention to the coffer of St. Ursula, at Bruges, and "The Seven Sorrows of the Virgin," at Munich, by the same hand, I might inquire whether this admirable ancient had been sufficiently credited with surpassing dramatic force and variety as a designer. But he has not wanted honour in your columns. I do not remember, however, that your critics have had opportunity to do justice to another artist, far different in school, style and epoch—I mean Vander Helst: and I see no mention in *the* Guide Book of his 'Conversation piece,' containing five life-size portraits (?) also in the Royal Gallery: and which, therefore, possibly, has been a recent acquisition. Yet it is worth good study. It is called, in the catalogue, 'A Young Gentleman presenting his Bride to his Parents'—no bad device for grouping together two married pairs. The interest ought, by courtesy, to have centered on the Bride: but perhaps the lady *was not* very comely, though serene and pleasant-looking,—so the painter gave her a blue satin under-petticoat, richly laced with gold (according to Mr. Secretary Pepys' fashion of contenting "the poor wretch" his wife). This makes the solitary bit of bright drapery-colour in the picture:—the rest is all black and delicious *steel grey* (as distinguished from the ash grey of *Il Cenerino*), with a few touches of faint yellow in the dress of the Page who stands at the elbow of the sitting elder lady, and eyes the new comer with at least as much curiosity as respect. But Vander Helst deserves a statue from those much abused personages, the mothers-in-law, for his vindication of their fair fame and virtue, in the Matron. She has not beauty, as the southerns have painted it,—but nobility, dignity, calm sense and affectionate welcome in her looks and attitude. She is gravely and complacently contemplating the young lady; with, perhaps, a touch of precision and counsel ready to come—or else it is the ruff's fault! Never was woman in her maturity more beautifully painted: the hands so firm, so round,—their flesh so pearly clear, the clearness being *set off* by the happy artifice of a grey glove, which she has forgotten to put on. The saucy Page, too, at her side, with a couple of splendid hounds, and a hooded hawk on his fist, is a figure and a piece of hand-work, not to be forgotten. The men are "persons of mark and likelihood,"—but have less character. On the whole, there are few more attractive family pictures than this vision of happiness, reverence, duty, and gentle breeding,—genius and beauty, perhaps, left out. At all events, it has not a touch of Dutch *vulgarity*—as the phrase has too exclusively run; and might be hung among the Doges of Bellini, and the Kings of Velasquez, and the Poets of Titian (his Clement Marot is not far distant, for any one desirous of trying the experiment) without any danger of these exclaiming, with Nell Gwynne, "Odds fish! what company have I fallen in with?"—A more brilliant and forcible pair of portraits—instinct with yet more of that burgher dignity which, like yeomanly sturdiness, is surely as physically ennobling as mere aristocracy of name—are 'Madame Pellicome and Child,' by Rembrandt, in the royal collection; one of the master's best preserved works, painted with his fullest but finest pencil—not *trowel*. The bright, intelligent face of the child haunts me, as I write:—but this picture is, possibly, better known than the above. I presume it may be referred to its painter's most careful time,—at which the famous, but revolting, dissecting group (in the Public Gallery,) was also painted.

While upon fine Dutch portraits—not merely as pieces of animal painting, but as keeping alive the memory of what is beautiful (if another type than the southern's is admitted)—I should like also to call attention to the great Haerlem corporation pictures by Frank Hals; who belonged to the place, and painted the worthies of its municipality, and the brave hearts who belonged to its St. George's company of riflemen, for the walls of the Town Hall,—where they hang even unto this day. These gentry, it is true, have names that clink more whimsically in the English ear, than Doria or Colonna, or Medina Sidonia, or De Joinville, or Talbot, or Percy; but call them king's sons or king's cousins, and the proudest royal blood would suffer no discredit by their appearance. The likenesses are obviously close and striking. Some of the heads are admirably *gaillards*,—some shrewd and dignified; and one, belonging to a youth carrying a standard, in an oblong picture in the corridor, has an ideal grandeur which reminded me of Correggio's young men with wind-blown hair. The lights in which these pictures hang are desperate; and I fear that the *Pope's heads* of the dimity-jacketted housewives of Haerlem have been let loose upon them:—but they are a very fine series, richly coloured, freely touched, and, the necessities of the case considered, tolerably well grouped. I should like to see them more advantageously displayed; yet who could wish them elsewhere than in the old, bare rooms of the red and white Town Hall at Haerlem?

My Dutch *exceptions*—to return to the Hague—received large additions from M. Steengracht's collection,—which is now the most important private gallery in the town. A more delightful lounge (the highest excitements of Art dispensed with) could not be imagined, were lounging permitted. But the guardian of these treasures—a choice specimen of the Dutch housekeeper, and curiously like one of those pink and white shell women you buy at Scheveningen—became very impatient at my unwillingness to keep up with her trot round the rooms, and prohibited my taking notes. *As I understood no Dutch*, I disobeyed to a small extent,—so much was there of first-rate interest. Some graceful Netschers; a little Cuyp, of a Page (a gentleman's son be sure!)

* By Mrs. Schimmelpenninck. This Lady's works have been more read, and her researches more used, than is fair, considering how little her name is known beyond the world of Dissenters. Her admirably written and interesting 'Tour to Aleh and Port Royal,' published some thirty years ago, was too universally overlooked,—when an article in a recent number of the *Edinburgh Review*, on the Port Royalists, excited so much sensation in "the circles," by the novelty of its matter.

holding a horse for a Cavalier, worth its weight in gold; two capital Wouvermanns—one finished to almost the exquisite delicacy of a missal painting; another dear lady in black by Vander Helst; a life-size boy, in a gray dress, by Metzu; and a Karel du Jardin—charming in subject. This is a mountain scene: the figure a little herd-boy, Tyrolese or Italian by his dress, who has come out for his solitary day's service,—as the covered basket and the little barrel tell. He has thrown himself down on the turf; and is toying with his dog, a staid grey pony and two sheep. I recollect no specimen of the master so rich in tone as this. It is nearly as fresh, too, as when it came from the easel, for the Steengracht of his day.

This reserved—as one of the most desirable cabinet pictures in being—the Teniers would by most be owned as worth the rest of the collection. It is a picture which goes to the heart—as, in their order, the works of Hemlink, and Vander Helst, aye, and Hals, already mentioned do—on a familiar subject, almost spiritualized by the touching homeliness with which it is treated. It is a dole at a nobleman's gate. He is seen, at a distance, in the archway of a tower—very fine—in his cloak and floating feather, as a nobleman should be!—but the interest is in the foreground, with the bearded and furred almoner (curiously like the portrait of our Lord Burghley), giving bread to a peasant—the almoner's assistant, in a stiff suit of lilac—satisfying a poor woman's family with soup—three or four busy creatures who are casting a garment over a naked man,—and, most of all, the cripple in the foreground, who looks upward towards the treasury of good things, in veneration, and with eagerness and gratitude! There are many Teniers', abroad, more excellent as pieces of colour,—for this seemed to me (if one might venture such a heresy) a little more earthy than the master's wont; but I have seen saints by the cubit and hierarchies by the acre, by Roman Catholic painters well esteemed, less *religious*, in the purest sense of the word, than this;—and that quality, were it alone, instead of being one among many, I think should amount to a "plea of mitigation."

P.S.—I should have thought it impossible to exceed the abomination of the arch on Constitution Hill, as the cite of a statue, had I not seen where the Count de Nieukerke's William the First has recently been set on its pedestal, at the back of the new palace on the Kneuterdyk. In itself, the building is as bad as building can be. Worse might be done than replacing the phrase of "Carpenter's Gothic" by "Dutch Gothic," if this be a specimen. Built of yellow brick—an amorphous composition of pavilion, screen and central archway, with lumpish forms, and stumpy pinnacles—it were hard, I suspect, to find a parallel example so ugly, so inexpressive, and so strangely betraying ignorance of every principle which all the world has long since admitted, if not acted upon. The old lumbering brick Binnenhof is a Parthenon of taste and beauty compared to it, in my irreverent eyes. As background then, nothing could well be worse. But there stands the statue: having just ridden, as it were, out of the central pavilion; the arch behind it closed by a common iron gateway, and the equestrian figure itself set on a pedestal:—thus at once blocking up an entrance and being neither in the palace nor out of the street. The offence which our "Iron Duke" will give to all save his Grace of Belvoir, Sir Frederick, and *Master* Matthew, is really less than this. In itself, the statue is a fine, flashy, spirited figure, full of *bravura* and motion, in the florid style,—which, indeed, was enjoined by the period of *costume*, &c.. But that style is so well carried out as to please me far better than any straining after classical simplicity with such a subject would have done. There is fine modelling, too, in the horse. Really, when works of this force and brilliancy—not to recall those at home—are to be found in the world, other sculptors, and better ones than those of *Pig-tail* Georges and Dudley dogs, may look to "their laurels," lest the amateur Counts win and wear them. A hundred years ago, they would hardly have got beyond the *dilettantism* of patronizing bad painters and buying old china.

Fine Art Gossip.—The Norman Tower, Bury, says a morning paper, has now undergone the *experimentum crucis*. The great eastern arch is removed; and the centre of that front is supported by shores, until the arch can be replaced. The jambs and pillars to support the new arch being completed, the hideous breach was effected; and the shattered state of the ashlar and core fully bore out the statements of Mr. Cottingham as to the peril in which this part of the edifice had stood until the precaution was taken of inserting the temporary centre. A chasm is now presented, about fifteen feet wide, and the same height from the spring of the arch,—in which the massive structure, eighty feet high and nearly six feet in thickness, has no other perpendicular support than the shores abovementioned: but the sound union effected in all the fissured parts above, and the immense power of the iron ties by which the tower is bound together at four stages, probably rendered the buttresses at the angles sufficient to hold up the centre without the additional precautions which have been prudently taken. The insertion of the new arch will be commenced immediately,—and proceeded with as expeditiously as consists with the solidity of the work.

The Archæological Society of Athens is busily pursuing the work of excavation. It commenced in the Acropolis last year; and some *débris* never before examined have been turned over on the south side of the Parthenon. Of the Metopes, a contemporary states that small fragments only have been found. Of the frieze of the south side of the building, two entire and two half slabs have been discovered; of which the two former are pretty well preserved, and form part of the throng of horsemen. Several triglyphs have also been found,—which, from their size, appear to have belonged to an inner row of columns. That these columns were of the Doric order was ascertained some years since, by the impressions found on the floor of the cella. Another more distant locality has, also, been searched—viz., the mountainous country between the Corinthian Coast and Epidaurus. This locality has, of late, yielded a great many vases; and the latest discovery is a very fine statue of Parian marble, of old Greek style, and nearly complete with the exception of the feet and an arm. It represents a young Athlete or Apollo. "It is curious to observe," says our contemporary, "that the above locality is not mentioned in ancient topography as containing any place of note, except the Corinthian haven of Peiræon, and two villages named by Thucydides. But it may be, after all, that it is this absence of a crowded population which has been instrumental in the preservation of art-treasure within its soil."

From Paris, we learn, that M. Alaux, the painter, has been appointed, by the King, Director of the French School of Painting at Rome.

The bronze statue of Duke Adolphus the Fourth, of Holstein, who gained, in 1227, the battle of Benhoevde over the Danish monarch Waldemar II., has been subjected to an extraordinary mutilation—the character of which, however, indicates that political hatred was the instigator of the Vandal act. The sword and helmet have been broken away. The statue was erected more than two centuries ago by the citizens of Hamburgh, to commemorate the benefits obtained for their city by the battle in question.

Rauch's model for the colossal statue of the Grand-duke of Mecklenburg-Schwerin has arrived at Merseburg for casting in bronze. The statue will be eleven feet in height; and stand on a granite pedestal, thirteen feet high, in the square of the grand-ducal palace at Schwerin.

A correspondent of the *Literary Gazette* has furnished to that paper some particulars, which are interesting if they may be relied on, relating to the discovery of certain works by Michael Angelo and other artists of renown. That our readers may have all the materials for judging of the authenticity which we possess ourselves, we will state that the correspondent is described as a lady married into a collateral branch of the family of the great Italian; and inhabiting, with her husband, the palazzo which belongs to it by descent. A minute search through the Buonarotti Gallery, undertaken in the hope of concealed treasure of this kind, has led to results which we will borrow, from our contemporary, the lady's language (and her authority) to describe:—"Upon opening the door I found Michael Angelo's own original wax model of his superb David, looking even *more* majestic and imposing than the well-known gigantic statue on the Piazza del Gran Duca,—which may be imputed to the fact of his having been stinted in the size of the block of marble. Besides this master-piece, the cupboard further contained two other wax models by Michael Angelo, one his Giorno, the other his Crepuscolo,—both of which are in the chapel called Cappello di Michel Angelo in the Church of St. Lorenzo. There were likewise in this same closet models in clay by Giovanni di Bologna; they are his first conceptions of his most celebrated groups and statues. Another in wax, by Baccio Bandinelli, besides another by an unknown hand. Then, at the bottom of all, under a thick veil of cobweb, I perceived a quantity of fragments, which appeared to me of surpassing beauty. I collected the pieces, and joined them together with boiling wax, thread, &c. &c.; when, to my great delight, I found my fragments assumed the form of the torso and legs of a Satyr, which is one of the finest works of Art that can be imagined. The celebrated engraver Jesi and another artist chanced to call upon us, and both proclaimed the Satyr to be the work of Michael Angelo;—but *then*, we had no *proof* of such being the case. Now comes what I deem the marvellous part of the story. The following morning, I again occupied myself groping and poking about the gallery,—particularly in an old cabinet or closet which they say Michael Angelo used to write in. At length, I pulled out a drawer, the handle of which was missing; in consequence of which, I presume, it escaped being ransacked by servants and others for centuries,—as I found there in a beautiful coloured-glass scent-bottle, of so elegant a shape and so beautifully mounted in silver in the antique style, that there is little doubt of its being a little ornament of the sixteenth century. Be that as it will, it is a matter of no consequence compared with the treasure I found exactly under this said bottle,—viz., a letter, dated 1660, from one Covr. Pansani, who begs the Proc. Buonarotti to accept a *Torso di Satiro*, the work of his great ancestor Michael Angelo.* *—In this extraordinary manner have I obtained the proof wanting of the authenticity of my *Satiro*."

MISCELLANEA

Paris Academy of Sciences.—Sept. 14.—A communication was received from Mr. Morse, giving an account of the extent of the telegraphic lines already established in the United States of America. It is as follows:—

	Miles.
Albany to Buffalo	350
New York to Boston	220
Do. to Albany	150
Do. to Washington	230
Washington to Baltimore	40
Baltimore to Philadelphia	97
Philadelphia to New York	88
New York to Newhaven	84
Newhaven to Hartford	30
Hartford to Springfield	20
Springfield to Boston	98
Albany to Rochester	252
Total	1659

Mr. Morse states, in his letter, that the electric telegraph is now the chief mode of transmitting all the news of the Government and the important correspondence of merchants and of the public generally. Its influence has, he says, been already felt by the press. The journals of the large towns, which were taken in the country on account of their giving the most recent news, have lost a great number of their subscribers; whilst there has been a very large increase in the circulation of the journals of the small towns near the extreme points of the electric telegraphs.—A paper from M. Jobard was received on the Chinese system of boring wells by means of a rope instead of metallic rods. He states that M. Goublet-Collet has adopted this system with the best results in Champagne; and that the cost is only 3 fr. per foot, without any increase according to depth. The whole of the apparatus costs only 500fr.—M. Biot, in his own name and in those of Messrs. Babinet and Pouillet, read a favourable report on an apparatus, constructed by M. Rumkorff, to facilitate the exhibition of the optical phenomena produced by transparent bodies when they are placed between the opposite poles of a magnet of great power.—M. Velpeau presented, in the name of M. C. Sédillot, of Strasburg, a summary of a work on cancerous affections. The object is to show the advantage that may be derived from the use of the

microscope in the examination of tumours supposed to be cancerous. The author is of opinion, however, that the diagnosis of a great number of tumours is now sufficiently established, without the use of the microscope.—A letter was received from Mr. Forster, giving an account of his having discovered, on the night of the 13th, a meteor, leaving the constellation Cygnus, and taking a westerly direction. It left a train, which was visible only for one second.

Sept. 17.

Allow me to add the following to the ludicrous instances of involuntary versification given in your number of August 15. The Rev. Thomas Smart Hughes, in his History of England, says of Mr. Vansittart, that he

> Took refuge from the jeers
> Of modern financiers,
> In the House of Peers,
> Under the title of Lord Bexley.

HUMBLE PROSE.

The Moon.—The following is the appearance of the moon, as seen in the great telescope of Lord Rosse, and described by the Rev. Dr. Scoresby, of Bradford:—"It appeared like a globe of molten silver, and every object of the extent of a hundred yards was quite visible. Edifices, therefore, of the size of York Minster, or even of the ruins of Whitby Abbey, might be easily perceived if they had existed. But there was no appearance of anything of that nature; neither was there any indication of the existence of water or of an atmosphere. There was a vast number of extinct volcanoes, several miles in breadth; through one of them there was a line in continuance of one, about one hundred and fifty miles in length, which ran in a straight direction like a railway. The general appearance, however, was like one vast ruin of nature; and many of the pieces of rock, driven out of the volcanoes, appeared to be laid at various distances." The Doctor says he expects it will soon be possible to daguerréotype the image of the moon upon the speculum—which cannot be done at present, as the moon is not stationary; but the Earl contemplates a piece of mechanism to move the telescope to a certain distance, with a motion corresponding to the movement of the moon.

SIXTEENTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[*From our own Correspondents.*]

WEDNESDAY, SEPT. 16.

A joint deputation of the Geological and Mechanical Sections, headed by the President, proceeded, at 1 o'clock, to the boring on Southampton Common. After hearing the report of the engineer, and examining the evidence of the strata, the President observed that there was every probability, on their reaching the upper greensand below the chalk strata, that a sufficient supply of water would be obtained. Whether or not it would rise to the required level would depend, however, upon the level at which the upper greensand entered. He advised, however, the continuance of the work. It appears the well already gives 15,000 cubic feet of water; the supply required for the town being from 30,000 to 35,000.

GENERAL COMMITTEE.

The following are appointed Members of Council for the ensuing year:—

Prof. Ansted, Sir H. T. De la Beche, Major Clerke, Prof. E. Forbes, Prof. Graham, Prof. Grove, W. J. Hamilton, Esq., L. Horner, Esq., J. Heywood, Esq., Sir J. Herschel, W. Hopkins, Esq., R. Hutton, Esq., Capt. Ibbetson, Prof. Latham, Sir C. Lemon, The Marquis of Northampton, G. R. Porter, Esq., Sir J. Richardson, Dr. Roget, Capt. Sir J. C. Ross, Dr. Royle, H. E. Strickland, Esq., Col. Sykes, W. Thompson, Esq., T. Tooke, Esq., Prof. Wheatstone, Dr. Williams, Prof. Willis.

And as Auditors,—Prof. Ansted, Prof. Willis, and Major Clerke.

Col. Sabine was re-appointed *General Secretary*, John Taylor, Esq. *Treasurer*, and John Phillips, Esq. *Assistant General Secretary*, for the ensuing year.

The General Committee assembled at 3 o'clock; when the following grants of money, having been previously sanctioned by the Committee of Recommendations, were unanimously voted:—

	£.	s.	d.
Kew Observatory	150	0	0
Mathematical and Physical Science.			
Computation of Gaussian Constants (continuation)	50	0	0
Researches on Atmospheric Waves	10	0	0
Construction of a new Anemometer	10	0	0
Completion of Catalogue of Stars, for which Government had granted 1,000*l.*, but which required 70*l.* to complete	70	0	0
Chemical Science.			
Researches and Report on Crystalline Slags, &c.	20	0	0
On Colouring Matter	10	0	0
Zoology and Botany.			
On Vitality of Seeds	10	0	0
On the Marine Zoology of Corfu	10	0	0
Marine Zoology of Cornwall	10	0	0
Marine Zoology of Britain	10	0	0
Habits of Marine Animals	10	0	0
Scorpion. ditto, and Arachnidæ	10	0	0
Tabular Forms for registering Phenomena	10	0	0
Physiology.			
Physiological Action of Medicines	20	0	0
Total Grants recommended	£410	0	0

The following were the recommendations (not involving grants of money) which received the sanction of the General Committee:—

Reports to be made or continued.

On the Theory of Movements and Displacements of the Earth's Crust, by W. Hopkins.—On the Static and Dynamic *Facts* which have been observed to be the Results of Earthquakes, by R. Mallet, Esq.—On the State of Knowledge of the Acalephæ, by Prof. E. Forbes.—On the State of the Science of Naval Architecture, including Steam Navigation, by J. Scott Russell, Esq.—On the Recent Progress of Analysis, by R. Ellis, Esq.

Researches.

With the Actinograph, by R. Hunt, Esq. and F. Ronalds, Esq.—On the Influence of Light on the Growth of Plants, by R. Hunt, Esq.—On the Corrosion of Iron Rails, by R. Mallet, Esq.

That Dr. Whewell be requested to draw up Brief Instructions for Tide Observations by Voyagers.

That Dr. Whewell and Sir James Ross be requested to draw up a plan for a Naval Expedition for the purpose of completing our Knowledge of the Process of the Tides.

That the following communications presented to this Meeting be printed entire in the Transactions of the Association:—Dr. Forchhammer, 'On Sea Currents,' and Prof. Owen, 'On Cranial Vertebræ.'

That Section G. be re-united to Section A., and that the Section be denominated the Section of Mathematical, Physical and Mechanical Science.

That application be made to Her Majesty's Government for a careful survey of the so-called parallel roads of Glen Roy, in reference to horizontality, parallelism, elevation above the sea, &c.

That application be made to Her Majesty's Government to have published the Meteorological Observations which have been made by the officers of the Irish Trigonometrical Survey at Mountjoy and the Pigeon-house, since the year 1834.

Mr. TAYLOR read the following account of the tickets issued at the Southampton Meeting:—

	Number of Tickets.	Payment.
Old Life Subscribers	241	.....
New ditto	11	£110
Old Annual Subscribers	67	—
New ditto	39	78
Associates	263	263
Foreigners	19	—
Ladies	198	198
Prince Albert's contribution		100
Sale of Books		84*s.* 8*d.*
Total		£762 4*s.* 8*d.*

The following is an abstract of Mr. LYELL's discourse, delivered, as we stated, on Monday the 14th:—'On the Delta and Alluvial Deposits of the Mississippi, and other points in the Geology of North America, observed in the years 1845, 6.'—The delta of the Mississippi may be defined as that part of the great alluvial plain which lies below, or to the south of the branching off of the highest arm of the river, called the Atchafalaya. This delta is about 13,600 square miles in area, and elevated from a few inches to ten feet above the level of the sea. The greater part of it protrudes into the Gulf of Mexico beyond the general coast line. The level plain to the north, as far as Cape Girardeau in Missouri above the junction of the Ohio, is of the same character, including, according to Mr. Forshey, an area of about 16,000 square miles, and is, therefore, larger than the delta. It is very variable in width from east to west, being near its northern extremity, or at the mouth of the Ohio, 50 miles wide; at Memphis 30; at the mouth of the White River 80, and contracting again farther south, at Grand Gulf, to 33 miles. The delta and alluvial plain rise by so gradual a slope from the sea as to attain, at the junction of the Ohio (a distance of 800 miles by the river), an elevation of only two hundred feet above the Gulf of Mexico. Mr. Lyell first described the low mud banks covered with reeds at the mouths of the Mississippi, and the pilot-station called the Balize; then passed to the quantity of drift wood choking up the bayous, or channels, intersecting the banks; and, lastly, enlarged on the long narrow promontory formed by the great river and its banks between New Orleans and the Balize. The advance of this singular tongue of land has been generally supposed to have been very rapid, but Mr. Lyell and Dr. Carpenter, who accompanied him, arrived at an opposite conclusion. After comparing the present state of this region with the map published by Charlevoix, 120 years ago, they doubt whether the land has, on the whole, gained more than a mile in the course of a century. A large excavation, eighteen feet deep, made for the gas works at New Orleans, and still in progress, March 1846, shows that much of the soil there consists of fine clay or mud, containing innumerable stools of trees, buried at various levels in an erect position with their roots attached, implying the former existence there of freshwater swamps covered with trees, over which the sediment of the Mississippi was spread during inundations, so as slowly to raise the level of the ground. As the site of the excavation is now about nine feet above the sea, the lowest of these upright trees imply that the region where they grew has sunk down about nine feet below the sea level. The exposure, also, in the vertical banks of the Mississippi at low water for hundreds of miles above the head of the delta, of the stumps of trees buried with their roots in their natural position, three tiers being occasionally seen one above the other, shows that the river in its wanderings has opened a channel through ancient morasses, where trees once grew, and where alluvial matter gradually accumulated. The old deserted beds also of the river, with banks raised fifteen feet above the adjoining low grounds, bear testimony to the frequent shifting of the place of the main stream; and the like inference may be drawn from the occurrence, here and there, of crescent-shaped lakes, each many miles in length and half a mile or more in breadth, which have once constituted great curves or bends of the river, but are now often far distant from it. The Mississippi by the constant undermining of its banks, checks the rise of large commercial towns on its borders, and causes a singular contrast between the wealth and splendour of eight hundred or more fine steamers, some of which may truly be called floating palaces, and the flat monotonous wilderness of uncleared land which extends for hundreds of miles on both sides of the great navigable stream. Mr. Lyell visited, in March 1846, the region shaken for three months in 1811-12, by the earthquake of New Madrid. One portion of it, situated in the States of Missouri and Arkansas is now called "the sunk country." It extends about seventy miles north and south, and thirty east and west, and is for the most part submerged. Many dead trees are still standing erect in the swamps, a far greater number lie prostrate. Even on the dry ground in the vicinity, all the forest trees which are of prior date to 1811 are leafless: they are supposed to have been killed by the loosening of their roots by the repeated shocks of 1811-12. Numerous rents are also observable in the ground where it opened in 1811; and many "sink-holes," or cavities, from 10 to 30 yards wide and 20 feet or more in depth, now interrupt the general level of the plain, which were formed by the spouting out of large quantities of sand and mud during the earthquake. In attempting to compute the minimum of time required for the accumulation of the alluvial matter in the delta and valley of the Mississippi, Mr. Lyell referred to a series of experiments, made by Dr. Riddell, at New Orleans, showing that the mean annual proportion of sediment in the river was, to the water $\frac{1}{1313}$ in weight, or about $\frac{1}{2500}$ in volume. From the observations of the same gentleman, and those of Dr. Carpenter, and of Mr. Forshey (an eminent engineer of Louisiana), the average width, depth, and velocity of the Mississippi, and thence the mean annual discharge of water, are deduced. In assuming 528 feet (or the tenth of a mile) as the probable thickness of the deposit of mud and sand in the delta, Mr. Lyell founds his conjecture on the depth of the Gulf of Mexico, between the southern point of Florida and the Balize, which equals on an average 100 fathoms. The area of the delta being about 13,600 square statute miles, and the quantity of solid matter annually brought down by the river 3,702,758,400 cubic feet, it must

have taken 67,000 years for the formation of the whole; and if the alluvial matter of the plain above to 264 feet deep, or half that of the delta, it has required 33,500 more years for its accumulation, —even if its area be estimated as only equal to that of the delta, whereas it is, in fact, larger. If some deduction be made from the time here stated, in consequence of the effect of drift wood, which must have aided in filling up more rapidly the space above alluded to, a far more important allowance must be made, on the other hand, for the loss of matter, owing to the finer particles of mud not settling at the mouth of the river, but being swept out far to sea, and even conveyed into the Atlantic by the Gulf stream. Yet the whole period during which the Mississippi has transported its earthy burthen to the ocean, though perhaps far exceeding 100,000 years, must be insignificant, in a geological point of view, since the bluffs or cliffs bounding the great valley (and therefore older in date), and which are from 50 to 250 feet in perpendicular height, consist in great part of loam, containing land, fluviatile, and lacustrine shells of species still inhabiting the same country. These fossil shells, occurring in a deposit resembling the *loess* of the Rhine, are associated with the bones of the mastodon, elephant, tapir, mylodon, and other megatheroid animals; also a species of horse, ox, and other mammalia, most of them of extinct species. The loam rests at Vicksburg and other places on eocene, or lower tertiary strata, which, in their turn, repose on cretaceous rocks. A section from Vicksburg to Darien, through the States of Mississippi, Alabama, and Georgia, exhibit this superposition, as well as that of the cretaceous strata on carboniferous rocks at Tuscaloosa. Mr. Lyell ascertained that the huge fossil cretacean, named Zeuglodon, by Owen, is confined to the eocene deposits. In the cretaceous strata, the remains of the mosasaurus, and other reptiles, occur without any cetacea. The coal-fields of Alabama were next alluded to; from which fossil plants have been procured, by Prof. Brumby and Mr. Lyell, of the genera sphenopteris, neuropteris, calamites, lepidodendron, sigillaria, stigmaria, and others, most of them identical in *species*, as determined by Mr. C. Bunbury, with fossils of Northumberland. This fact is the more worthy of notice, because the coal of Tuscaloosa—situated in lat. 33° 10′ N.—is farther south than any region in which this ancient fossil Flora had previously been studied, whether in Europe or North America; and it affords, therefore, a new proof of the wide extension of a uniform Flora in the carboniferous epoch. Mr. Lyell—adverting to the opinion recently adopted by several able botanists, that the climate of the coal period was remarkable for its moisture, equability, and freedom from cold, rather than the intensity of its tropical heat—stated that this conclusion, as well as the oscillations of temperature implied by the glacial period, are confirmatory of the theory first advanced by him, in 1830, to explain the ancient geological changes of climate, by geographical revolutions in the position of land and sea. The lapse of ages, implied by the distinctness of the fossils of the eocene, cretaceous, carboniferous, and other strata, is such, that, were we to endeavour to give an idea of it, we must estimate its duration, not by years, as in the case of the delta, but by such units as would be constituted by the interval between the beginning of the delta and our own times. "It is now fifty years," said Mr. Lyell, "since Playfair, after studying the rocks in the neighbourhood of Edinburgh, in company with Dr. Hutton and Sir James Hall, was so struck with the evidence they afforded of the immensity of past time, that he observed, 'How much farther reason may go, than imagination can venture to follow!' These views were common to the most illustrious of his contemporaries; and since that time have been adopted by all geologists, whether their minds have been formed by the literature of France, or of Germany, or of Italy, or Scandinavia, or England;—all have arrived at the same conclusion respecting the great antiquity of the globe, and that, too, in opposition to their earlier prepossessions and to the popular belief of their age. It must be confessed that, while this unanimity is satisfactory as a remarkable test of truth, it is somewhat melancholy to reflect, that, at the end of half a century, when so many millions have passed through our schools and colleges since Playfair wrote that eloquent passage, there is still so great a discordance between the opinions of scientific men and the great mass of the community. Had there been annual gatherings, such as this, where they who are entitled to speak with authority address themselves to a numerous assembly, drawn from the higher classes of society, who, by their cultivation and influence, must direct the education and form the opinions of the many of humbler station, it is impossible that so undesirable and unsound a state of things should have now prevailed as that where there is one creed for the philosopher and another for the multitude. Had there been meetings like this, even for a quarter of a century, we should already have gained for geology the same victory that has been so triumphantly won by the astronomer. The earth's antiquity, together with the history of successive races of organic beings, would have been ere this as cheerfully and universally acknowledged as the earth's motion, or the number, magnitude, and relative distances of the heavenly bodies. I am sure it would be superfluous if I were to declare, in an assembly like this, my deep conviction, which you—all of you—share, that the further we extend our researches into the wonders of creation in time and space, the more do we exalt, refine, and elevate our conceptions of the Divine Artificer of the Universe."—Mr. Lyell concluded this discourse by announcing his corroboration of the discovery, recently made by Dr. King, at Greensburg, thirty miles from Pittsburg, in Pennsylvania, of the occurrence of fossil foot-prints of a large reptilian, in the middle of the ancient coal-measures. They project, in relief, from the lower surfaces of slabs of sandstone; and are also found impressed on the subjacent layers of fine unctuous clay. This is the first well-established example of a vertebrated animal, more highly organized than fishes, being met with in a stratum of such high antiquity.

Section A.—Mathematical and Physical Science.

St. Leonard's College, St. Andrew's, Sept. 23.

In your notice of the reading of my paper "On a New Property of Light," &c. (in which, by the way, the word *cross* is by mistake substituted for *crop*) I observed that "Dr. Whewell conceived that this was rather a curious action of the chrysammate of aloetinate of potash* than any new property of light,"—and that "Sir John Herschel was inclined to agree in that opinion." There can be no doubt, as the title of my paper indicates, that it is *an action of the chrysammate*;—but there can be as little doubt that it is a property of light, and a new one also. Almost every property of light—its refrangibility, its reflexibility, its polarization, and its double refraction are all exhibited by the *action* of bodies upon light. If it is a property of light to be polarized in one plane by the action of the surfaces of common transparent bodies, it is equally a property of light, and a very remarkable one, that *white light is decomposed and separated into two pencils differently coloured and polarized in two opposite planes.* If it is a property of light that, when reflected from the surface of calcareous spar, it is acted upon by the internal force of double refraction, without changing its colour and without being separated into two pencils, it is a more remarkable property *that a doubly refracting substance like the chrysammate of potash should both decompose and double the pencil.* Almost all the properties of bodies are developed by the action of other bodies; and, were it necessary, I could show that the language which I have used in the title of my paper has the sanction of the most distinguished philosophers.

D. Brewster.

Saturday.

'On Atmospheric Waves,' by W. R. Birt.—In introducing his Report, the author noticed the steps he had taken during the last autumn for observing the great symmetrical wave of November. Instructions detailing the instruments to be observed, times of observation, &c., were drawn up and circulated in the *Athenæum* for Sept. 6, 1845. In accordance with these instructions, about thirty sets of observations had been made; the stations extending in one direction from the west of Ireland, to Heligoland and in the other from the Scilly Isles to the Orkneys. These observations Mr. Birt had subjected to a very careful comparison, especially those made at his own residence near London, with those which he made in the autumn of 1842 at Leicester Square. The result of this comparison was such as clearly to show that there was a most striking coincidence between the barometric movements of October and November 1845, and those of a portion of September, October, and November 1842. So close did this coincidence appear to the author that, during the period from October 1 to November 21, in 1845, the barometric movements of October 23 to 26, were the only oscillations that appeared to have no corresponding movements in 1842. It appeared that the great wave commenced in 1845, near midnight, between the 6th and 7th; that it culminated on the 14th, and terminated on the 21st. During the 10½ days previous to the setting in of the wave, the movements in 1842 and 1845 were almost identical. Mr. Birt observed that, in 1845, the great wave in all its essential features was very distinctly marked; that it was completely separated from all the preceding barometric movements; and that the *individuality* that was thus given to it induced the strong belief that we have obtained the *type* of the barometric oscillations during the middle portion of November. This type he proposed to express in the following language:—"That during fourteen days in November more or less equally disposed, about the middle of the month, the oscillations of the barometer exhibit a remarkably symmetrical character; that is to say, the fall succeeding the transit of the maximum or highest reading, is, to a great extent, similar to the preceding rise. This rise and fall is not continuous or unbroken: in three out of four of the occasions on which it has been observed, it has been found to consist of *five* distinct elevations. The complete rise and fall has been termed the great symmetrical barometric wave of November, and as such has been considered to result from the transit of a large wave; but there is great reason to believe that while it may be due to the transit of a normal wave of about fourteen days' amplitude, it also exhibits the transits of *five* secondary superposed waves. At the setting in of the great November wave the barometer is generally *low*, sometimes below 29 inches. This depression is succeeded by *two* well marked undulations, varying from one to two days in duration. The central undulation, which also forms the apex of the great wave, is of larger extent, occupying from three to five days; when this has passed, two smaller undulations, corresponding to those at the commencement of the wave, make their appearance, and at the close of the last the wave terminates." Mr. Birt exhibited curves of observations that had been made during November at Dublin, from 1829 to 1845 inclusive, which he had received from Capt. Larcom of the Royal Engineers. From these curves it appeared that the great wave had been observed at Dublin in twelve out of seventeen years; and that with two exceptions in eleven years of distinct and well-marked transits of the great wave, the epochs of the maxima were confined to five days near the *middle* of the month, namely, from the 12th to the 17th. While exhibiting these curves, the author invited the attention of the Section to a very remarkable and apparently constant depression of the mercurial column which occurred about the 28th of November. It had been observed in fifteen out of the seventeen years' observations, and appeared to be unconnected with the great wave. The author then proceeded to notice the comparison he had instituted between the curves he had obtained from various stations, and exhibited curves from twelve stations in Ireland, England, and Heligoland. From a consideration of these curves, which were so arranged as to show the departure from symmetry in certain directions, he argued, that while the posterior slope of a wave of considerable magnitude was passing off towards the E.N.E. the front of another was approaching from the N.W., and that it was the interference of the two that produced the symmetrical arrangement of the curves. In that portion of the area covered by the advancing wave the barometer rose; and in that covered by the receding wave it fell; while in that in which the two waves interfered the atmosphere as regarded these waves was quiescent, and the

* Dr. W. is here mistaken;—as the aloetinate of potash has no such action and no such property.

smaller secondary waves passed on uninfluenced by them. He also showed that these lines of symmetry or interference varied in different years: in the year 1842 the line of greatest symmetry passed from Dublin through Brussels to Munich; in 1845 it appeared to be confined to the south of England. Mr. Birt next proceeded to notice the arrangements of the aërial currents or winds, with regard to the distribution of pressure. He stated that the observations on the winds in November 1842 clearly established Prof. Dove's theory of parallel and oppositely directed currents; and he showed, by diagrams, that if these currents are shifting ones, as the Professor suggests, as they pass over any tract of country in a direction transverse to those in which the wind was blowing in each, all the phenomena of an atmospheric wave would be produced. He remarked that if there was only one set of these parallel currents passing over a line of country, then the examination of the phenomena of an atmospheric wave would be comparatively easy. The discussion of the observations had, however, shown that there were two sets of parallel and oppositely directed currents, at right angles to each other; one set from the N.E. and S.W. with a lateral motion from the N.W., and the other from N.W. and S.E. with a lateral motion from the S.W.; and also that when these currents are referred to the wave, the N.E. and N.W. currents in their respective systems represent anterior slopes, with the direction of the aërial currents at right angles to the axis of translation directed towards the *left hand*, and the S.W. and S.E. currents represent posterior slopes, the direction of the aërial currents still at right angles to the axis of translation but directed towards the *right hand*. The author considered that these rectangularly posited currents, explained several phenomena, such as the barometric wind-rose, or the gradual rise of the barometer with N.W., N. and N.E. winds, and its fall with S.E., S. and S.W. winds, the revolution of the vane in one uniform direction, &c., and concluded his Report with pointing out several important desiderata that should be made the subjects of future inquiries.

This Report gave rise to a discussion, in which Mr. Harris, Dr. Whewell, Prof. Phillips, Prof. Stevelly, and Mr. Broun, took part.—Mr. Phillips said that currents of wind in several strata much influenced the indications of the barometer, and consequently required to be taken into account in such an investigation as the present. An easy way of finding the velocity of such currents was, by observing the rate at which the clouds moved; and as this required the altitude of the clouds to be previously known, he would mention an easy method of determining at once the altitude of a cloud, and the rate at which it was moving. Having provided an assistant with a theodolite, plant him near the spire of a church or high pole, so that the direction of the motion of the cloud shall be at right angles with the line joining the station chosen with the top of the tower or pole. Then, having fixed upon some remarkable point of the cloud which appears at a higher altitude than the top of the steeple, let the assistant direct the telescope of the theodolite to it; and you walk towards the spire, until you bring the top to coincide with the cloud agreed on. Then, measuring the distance of the two stations, and taking the angles of altitude of the cloud at the first station and top of the spire at the other, you have data sufficient for calculating the height of the cloud. The person with the theodolite then following the angular motion of the cloud across, and noting the time it takes to describe observed angles, its actual velocity may be calculated.—The Chairman said, he too had thought on this subject; and would take an early opportunity of bringing another method, which he considered simpler, before the Section.—Mr. Harris said, he thought it would be very desirable to induce aëronauts to take up persons, provided with meteorological instruments, and qualified to make observations previously well digested and prepared.—Mr. Broun expressed his belief that the cirrhus and higher clouds were nearly stationary.

'On the Recent Progress of Analysis,' by Mr. Ellis.—This voluminous report, with an index containing copious references to authors, will be printed at length in the next volume of Reports. It comprised only the portion of transcendentals; and the author has been requested to continue and complete it, for a future Meeting.

'On the Attempts to explain the Projection of a Star on the Moon, during an Occultation,' by Prof. Powell.—Some remarks having been brought forward at the last Meeting, relative to the singular phenomenon above named, in which "diffraction" was referred to as, at least, in a general sense, likely to afford an explanation, the author of this communication conceived that some observations which he has made might not be without a bearing on the question. "Diffraction" has often been appealed to in cases apparently of the same class; but, in the more strict and limited sense of the term, it cannot apply, since both the conditions and the resulting phenomena appear essentially different. The phenomena properly ascribed to "diffraction" exhibit *fringes*,—and suppose the edge of the intercepting body to be *within* the area of the rays. But there are some effects of a concomitant kind, which have been less attended to. One of the most remarkable of these is that described by Newton (Opt., book iii., part i., obs. 5, 6, 7), in which the light admitted through a hole, one quarter of an inch in diameter, falling on the edge of an opaque body, besides the phenomena since called "diffraction," gave rise to long streaks or "trains" of light darting into the shadow perpendicular to the edge, and shown on a *screen;* or, when the *eye* was substituted, producing a *luminous line* running along the edge, between it and the first fringe. It does not seem that any subsequent experimenter has reproduced this part of the phenomenon, and it probably requires the most extreme precaution. The author has succeeded in another way, as follows:—The aperture being one quarter of an inch diameter, at a distance of about eight feet was placed a circular opaque disk, three quarters of an inch diameter; and at two feet beyond it an eye lens of two inches focal length. The dark disk appeared with a trace of faint diffractive fringes round it; and a number of *streaks or trains of light* converging from its edge to its centre, which there crossing gave rise to a *bright round spot*. The appearance of *separate* streaks is clearly due to the irregularities of the edge; since with a *polished* edge they were not perceptible, and only a faint light was seen, but giving rise to a well-defined bright circular spot at the centre. Corresponding streaks appeared when a straight edge was used perpendicular to it. Though, in this experiment, the edge is *within* the area of the rays, yet a part of the same phenomenon (viz., the line of light along the edge) is seen, even when the edge is *beyond* the rays, by the naked eye, or with a telescope. When the orifice of light is reduced to a mere point (as by using the sun's rays reflected from a very small globule of mercury), and the rays are *wholly* intercepted by the disk at the distance of about two inches, so that both the luminous point and the disk may be seen at once in focus, by a small telescope, about twelve feet distant, the luminous patch on the edge of the disk at the part nearest the luminous point appeared to extend to a small distance *inwards*, and there the rays converging crossed, and diverged again faintly. This might possibly be regarded as affording some experimental imitation of the case of the star. The orifice is not an absolute point; but, if it were, the patch of light on the disk might appear like a projection of its image. Another explanation has been proposed of the phenomenon of projection; on the principle that, owing to *aberration*, the star being seen out of its true place, a screen, placed in its *true* direction, as the moon, would exhibit the star projected on its disk (Astron. Soc. Reports, vi. 246); and, taking into account the *proper motions* of the star, this will explain the appearance of the phenomenon in one instance and not in another, on the supposition that those proper motions are in opposite directions in the two instances. But this will not apply in the very instance to which reference has been made,—of the two stars 119 and 120 Tauri,—which have proper motions both in the same direction. Also the *principle* of this explanation is rendered questionable altogether, from what has been lately suggested by Prof. Challis on the theory of aberration. The whole subject is, perhaps, not yet ripe for explanation, since the first astronomers are so much at variance as to the facts,—the appearance having been often seen by one observer, and not by another: while it is believed by some to occur or not, according as the attention is directed to the moon or to the star; which, if true, would seem to point to some ocular cause. Hence, a further accumulation of instances is much wanted: any statement of which Prof. Powell would be thankful to receive, addressed to him, at Oxford.

This paper gave rise to a discussion, in which Prof. Stevelly, Mr. Harris, Mr. Broun, Prof. Phillips, Rev. Dr. Scoresby, Mr. Stokes, and the Chairman took part.

'On the Elastic Force of Vapour,' by Capt. Shortrede.—The author adopts the experiments of the French Academy at high temperatures, and those of Magnus at low temperatures, as being the most carefully performed, and the most extensive of all yet available. In the Academy's experiments, the indications of the smaller thermometer in the steam are preferred to those of the larger thermometer in the water; because the temperature of the water increases with its depth, and always exceeds that of steam formed at its surface, besides the heat which may be necessary to overcome the cohesion of water in passing into vapour. It is probable, also, that the temperature of the steam in the manometer was, from exposure to the air, less than that of the steam in the boiler; so that the small thermometer may be expected to give the temperature too high, rather than too low.

'On the Principle of Continuity, in reference to Certain Results of Analysis,' by Prof. Young.—This paper was purely mathematical.

MONDAY.

'On the Anemometer,' by Prof. Phillips,—in which he noticed a new principle as likely to be applicable for the production of instruments free from defects to be found in those now in use. In the anemometer thus suggested, it was proposed to measure the velocity of air by the rapidity of evaporation and the cold produced thereby. When the bulb of the thermometer, covered with cotton wool, is immersed in water and exposed to the air, the evaporation is known to produce a given amount of diminution of temperature; and when the thermometer is moved through the air, the rapidity of evaporation is increased. In the trials made by Prof. Phillips, he first ascertained the amount of diminution by simple exposure,—and then raised the temperature by the heat of the hand to that of the air, and marked, by a second-watch, the rapidity of cooling when the hand was withdrawn. By repeating this process in tranquil air, and when the thermometer was in motion, he was enabled to ascertain the increased rates of cooling by various degrees of speed, and on the other hand to tell the amount of speed by the rapidity of cooling. He tested this instrument on the South-Western Railway, and when the carriages were at the velocity of thirty-six miles an hour, his new anemometer indicated correctly the amount of velocity when it was held at the distance of two feet from the carriage. He did not profess to have constructed a perfect instrument, but his object was to call attention to the principle on which he thought an accurate instrument for measuring the velocity of the wind might be constructed.

Dr. Whewell said that the other avocations which engrossed his attention had for some time prevented his endeavouring to correct the few slight defects which the practical working of the anemometer, to which Prof. Phillips had alluded, detected; in particular, the accurate determination of the constant which connected its indications with the actual velocity of the wind at every instant. He now the less regretted this, as his friend, Dr. Robinson had constructed, and worked for some months, an anemometer, the connection of the motion of which with the velocity of the wind was less subject to vary, and was of easy determination. A model of this he had exhibited to the Mechanical Section. It consisted of two or three arms, attached to a spindle, carrying at their extremities hollow hemispheres of tin or copper, with the hollows of the hemispheres all turned in the same direction. The force of the wind exerted on the concave surfaces being four times as great as that on the convex, the spindle was made to turn in the same direction, whatever way the wind blew. Attached to the spindle were the count wheels of a gasometer; and the velocity thus determined was exactly the one-third of that of the wind. With respect to the

elevation of the clouds, he had long practised a very simple mode of determining it.

'Method of Measuring the Height of Clouds,' by Dr. WHEWELL.—I do not know whether it has been observed how easily the height of clouds may be measured when the reflexion of them can be seen in a lake from a station above it. In that case the angle of elevation above the horizontal plane for any selected point of a cloud is not equal to the angle of depression of the image; for the latter angle is the angle of elevation of the cloud *at the point of the lake* where reflexion takes place, and is, therefore, greater than the former. The difference of these two angles give us the means of proving the height of the cloud. If α be the angle of depression of the image of the cloud-point, β the angle of elevation, and h the vertical height of the station of observation above the level of the lake, it is easily shown by trigonometry that the height of the cloud above the level of the lake is

$$h \frac{\sin(\alpha + \beta)}{\sin(\alpha - \beta)}$$

The angles α and β may be measured by any contrivance for measuring elevations and depressions: for instance, a graduated quadrant with a plumb line, or hanging *alidade* and plain sights. No great accuracy is attainable or is needed in this inquiry. Hence a table of double entry (there being two elements, α and β) would be a convenient mode of determining the multiplier of h. But the multiplier varies rapidly, with variations of $\alpha - \beta$; more slowly with variations of $\alpha + \beta$. Hence it would be convenient that a table should be arranged for small intervals of $\alpha - \beta$ (say 1°, or below 1° to 15′), while larger intervals for α might suffice, as 5°. Hence this might be the form of the Table (or rather these the numbers to be calculated):—

$\alpha-\beta=$	0°	1°	2°	3°
$\alpha=1°$	∞	1		
$\alpha=5°$	∞	$\frac{\sin 9°}{\sin 1°}$	$\frac{\sin 8°}{\sin 2°}$	$\frac{\sin 7°}{\sin 3°}$
$\alpha=10°$	∞	$\frac{\sin 19°}{\sin 1°}$	$\frac{\sin 18°}{\sin 2°}$	$\frac{\sin 17°}{\sin 3°}$
$\alpha=15°$	∞	$\frac{\sin 29°}{\sin 1°}$	$\frac{\sin 28°}{\sin 2}$	$\frac{\sin 27°}{\sin 3°}$

And for intermediate values, the multipliers would be given by interpolation. But since the result depends so much upon the value of $\alpha - \beta$, it would be desirable to obtain $\alpha - \beta$ directly, rather than by taking the difference of two observations. This may be done thus:—Take a dark cup full of water, and place it so that the surface of the water in it is seen at the cloud-point reflected in the lake. Also place it so that the boundary of the water in the cup when it falls upon the cloud-speck is in the vertical plane passing through the speck. Then the horizontal edge of the cloud-speck, seen in the lake and in the water-cup, will be *dislocated*, and the amount of dislocation subtends the angle $\alpha - \beta$ at the eye. Hence $\alpha - \beta$ may be measured directly on the limb of the quadrant; or a micrometer affixed to the *alidade* of the quadrant for the purpose of measuring $\alpha - \beta$ may easily be devised. The same formula and process may obviously be applied to measure the height of a *mountain* when h is known. If the height of the mountain be known, h may be deduced by the same formula. Without knowing h the formula will serve for *comparing* the height of a cloud with that of a mountain, when both can be seen in the lake. The arc $\alpha - \beta$ will usually be very small, and will vary as its sine; and in this case $\alpha + \beta$ will be 2 α. Hence, in comparing clouds and mountains, their height will be as $\frac{\sin 2\alpha}{\alpha - \beta}$. Hence, the heights of a mountain and of a cloud *seen* very near the mountain top are inversely as the dislocations in reflexion. If the mountain image be dislocated three times as much as the cloud image, the cloud is three times as high as the mountain. If the altitude be different—for example, if the mountain be 15° and the cloud 45° elevated, and the dislocation still as 3 and 1, the height of the cloud is six times the height of the mountain (for, sin $2 \times 15° = \frac{1}{2}$, sin $2 \times 45° = 1$). The same is the case of different *strata of clouds*. When seen in the same quarter, their heights are inversely as the dislocation of their images.—N.B. Perhaps a piece of glass ruled with parallel equidistant lines held at a given distance from the eye would be a good way of comparing dislocations of images.

Prof. STEVELLY stated that Dr. Robinson's anemometer had been at work since last November; and that so trivial was the friction, when compared with the power of the engine, that its motion was quite perceptible in breezes which were too gentle to disturb the leaves on neighbouring poplar trees. This removed the only defect which Dr. Whewell complained of, as creating a difficulty in determining the relation of the velocity in his anemometer to that of the wind. Dr. Stevelly regretted that the absence of Dr. Robinson in another Section prevented him from detailing on this occasion the very satisfactory experiments by which he had determined the relation between the velocity of the wind and that of the instrument. This had been accomplished by comparative observations with Lind's anemometer, and other modes of determining the rapidity of the current, and then comparing them with his own. The experimental determination had been in almost absolute accordance with the determination of theory.

'Fall of Rain on the Coast of Travancore, and Table-Land of Uttray,' from observations of Major General CULLEN, resident in Travancore, by Colonel SYKES.—At former Meetings of the Association I have had the means of submitting to the Physical Section facts illustrative of the meteorology of portions of Western India; particularly at great elevations, such as at Mahabaleshwur, near Sattarah, when at the height of 4,500 feet above the sea, and at a distance of about 30 to 40 miles inland. It was shown that the fall of rain in one monsoon, was of the prodigious amount of 302·21 inches, or more than 25 feet depth of water. At a similar height, at Mercara, in Coerz, about 5° of latitude south of Mahabaleshwur, and in about the same longitude, and at 65 miles from Cananore on the coast, the mean fall of rain for the years 1838, 1839, 1840, was 143·35 inches. Communications from my friend, General Cullen, enable me to extend the meteorological observations, at least as far as relates to temperature and the fall of rain, to Cape Comorin; supplying also data for a comparison of the fall of rain on the coast and at short distances inland, at a considerable elevation. General Cullen's letter to me, is dated Cochin, 27th July, 1845, and he states that he had been in the habit for many years past of observing the meteorology of his location wherever that might be; but that the pressure of his public duties had disabled him from reducing and arranging the observations, particularly the barometrical. He had, however, been enabled to transmit to the government of Madras statements of the fall of rain along the Western or Malabar Coast of Hindoostan, from Cape Comorin in Travancore, lat. 8° 4′, to the town of Cochin and Pantghatcherry, in lat. 10° 45′, as well as at several inland stations in those provinces, and on the Company's district of Tinnevelly, on the east side of the Ghâts, for the years 1841, 1842, and 1843. These statements were accompanied with explanations, which I shall shortly notice. In the year 1841, the stations selected in Travancore were five; but the observations did not commence at Nagercoil, Trevandrum and Quilon before the month of May; and at Allopy and Cochin till the month of June. The stations on the east side of the Ghâts were three. At Varioor, the observations commenced in June; at Shencottah in July, and at Palamcottah, not before October. As the observations are not for equal periods, I shall confine myself to observing that both the Malabar and Coromandel coasts appear to have been subjected to both monsoons—the south-west and north-east, rain having fallen at all the stations in the months of October, November, and December, as well as in the usual south-west monsoon months of June to September inclusive. In the year 1842, the stations in Travancore were extended to eight, and the observations were for the whole year; with the exception of Tritchoor and Chiltoor, where they did not commence until May, and Koraventavatum, where they did not commence until August. At the three former stations in Tinnevelly, the observations were for the whole year. In this year, although both monsoons appear to have operated upon both coasts in the months of October and November, yet in the month of December rain only fell in one day on the Travancore Coast, and only five times at Palamcottah on the opposite coast. The same remarks apply, with almost equal force, to the months of January, February, and March; there only being 32 falls of rain, at all the eleven stations, together on both coasts during those three months. In the year 1843, Cape Comorin is added to the eight stations in Travancore, and the observations at all the stations are for the whole year. At Cape Comorin, at an elevation of 50 feet above the sea, we have the singular fact of not a single shower having fallen in the months of February, March, April, August, and November—months belonging to both monsoons; and the fall for the whole year, at Cape Comorin, was only 19·2 inches. At Palamcottah, on the Coromandel side, there was not a single fall of rain in the months of June, July, August, and September, and only one and three, and one and four falls respectively in the months of February and March at all the stations in Tinnevelly. The total fall at each station exhibits a rapid increase in quantity, in increasing the latitude, as is shown by the annexed tabular statement.

		TRAVANCORE.										COCHIN.						TINNEVELLY.					
		Cape Comorin, 50 feet above Sea.		Nagercoil, 150 feet above Sea.		Trevandrum, 130 feet above Sea.		Quilon, 30 feet above Sea.		Koraventavatum, 300 feet above Sea.		Alleppy, 30 feet above Sea.		Cochin, 20 feet above Sea.		Tritchoor, 60 feet above Sea.		Chiltoor, 400 feet above Sea.		Shencottah, 600 or 700 feet above Sea.		Palamcottah, 900 feet above Sea.		Varioor, 60 feet above Sea.	
		No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches	No. of days	Rain, inches
From May 1841 only	1841	..	..	73	46·8	103	66·7	124	94·76	..	..	140	96·66	124	77·03	..	..	..	..	28	30·48	20	From Oct. 14·57	29	18·05
	1842	..	..	63	35·7	97	57·07	131	81·06	Incomplete		168	104·05	119	105·27	Incomplete	104·94	82	52·03	51	39·45	71	23·01	60	20·27
	1843	32	19·2	71	45·6	124	85·45	121	105·07	182	129·0	184	131·85	138	124·49	115	80·15	108	68·06	68	48·01	88	26·09	66	25·75

It exhibits, also, the fact of the total fall on the Coromandel side bearing no comparison to that on the Travancore side. For instance, at Shencottah at the east base of the Ghâts, sixty miles from the sea coast of Travancore, and about eighteen miles due east

of Koraventavatum on the west side of the Ghâts, and 40 miles from Quilon. The fall of rain at Shencottah was 48·1 inches in 1843, and at Koraventavatum 129 inches; both places being at a considerable elevation. Palamcottah, again, is in the latitude of Quilon,—is 60 miles from the western coast, and 30 miles east of the chain of Ghâts. Here the fall of rain was 26·9 inches in 1843; while at Quilon, on the western coast, the fall was 105·7 inches. Cape Comorin and Varioor come into the same category; but the former is in Travancore, and the latter in Tinnivelly, the latter being only 3 miles north, and a little east from the former; but the difference is 6½ inches of rain in favour of Varioor. The next feature is in the singularly limited fall of rain at Cape Comorin and Varioor; both of them situated at the extremity of the peninsula of India, and both freely exposed to the first action of both monsoons, north-west and south-east, and yet the amount of rain is not one-fifth the amount of that which falls at places on the Travancore coast, or 4 miles north-west. Nagercoil is the next station to Cape Comorin, and comes into the same category—but is 9 miles inland. The next feature is the great and *progressive* increase in the fall of rain which takes place at the respective stations as they lie north-westward from Cape Comorin, along the western coast. Trevandrum, Quilon and Allopy are, apparently, under nearly similar physical circumstances on the coast; yet the first, in 1843, had only 85 inches, the second 105, and the latter 131 inches of rain. Chiltoor, which is 55 miles inland east from Quilon, and in the gorge of the great gap in the Ghâts at Palghât which opens to the Coromandel Coast of Tinnevelly, and in the high road, it might be said of the aqueous vapour, had only 88 inches, while Allepy, on the open coast, had 131 inches, and Cochin 126 inches. The fall of rain is greatest on the sea-coast;—diminishes at stations inland between the coast and the foot of the Ghâts;—but, as I shall have occasion to show, increases enormously on ascending the Ghâts to the crests, or table-lands. General Cullen says, it is difficult to attempt explanation of the differences in the amount of rain exhibited in his tables; but he offers some remarks on the winds and physical structure of the country, as necessarily influencing the distribution of rain. The peninsula of India, as is known, is in a triangular form, the apex of which is Cape Comorin. The Western Ghâts in maps appear to run continuously, without break, from Cape Comorin to 24° or 25° of latitude, but such is not the case. The land within the apex of the triangle to Palghât, a distance of 150 miles, rises precipitously into a table-land 2 or 3,000 feet high, with peaks and masses attaining an elevation of 5 or 6,000 feet. It has at its sides a narrow, low tract of land on both coasts. In the latitude of Palghât, the table-land suddenly terminates in a chasm or gap, 40 miles long by 30 broad, without a single hill or ridge. There are other gaps, but of less marked character. In one of these stands Shencottah. It might be supposed that the continuous passage of aqueous vapour through these gaps would continually drench them. Such is not the case,—as the vapour passes through only partially condensed; for Chiltoor, which is at the western gorge of the gap, has only 68 inches of rain, and Shencottah 48 inches: both, however, have rain in every month of the year, excepting July at Chiltoor, and in the month of November at both places there was only one fall of rain. The paucity of rain at Palamcottah General Cullen attributes to the interception of the vapour of the western monsoon by the table-lands of Travancore. But this does not explain the paucity of rain at Cape Comorin and Varioor, which are open to both monsoons; and why should they not be deluged at least by the west monsoon, as well as Allopy or Cochin? General Cullen made the observations which I have adverted to, without a view to the illustration of any particular meteorological phases or phenomena; but observing the publication, in the annual volume of the Association, of the extraordinary fall of rain at high elevations, as at Mahabaleshwur and Mercara, he was induced to ascertain whether a similar fact obtained on the high lands of Travancore. He, therefore, on the 23rd of June, 1844, established a pluviometer at a spot called Uttray Mullay, 30 miles east-north-east of Trevandrum, at an elevation of 4,600 feet above the sea (exactly that of Mahabaleshwur), and continued his observations simultaneously with others at Trevandrum and Quilon on the coast, until the end of December. The fall of rain on the table-land was 164 inches, while the fall at Trevandrum and Quilon, respectively, was only 36 and 36¼ inches. The variation of the monthly mean temperature at Uttray Mullay was only from 64° to 67° Fahr., and at Trevandrum from 77½° to 78½° Fahr.

1844.	Temperature.		Rain.		
	Uttray Mullay, 4600 feet.	Trevandrum, 130 feet.	Uttray Mullay, 4600 feet.	Trevandrum, 130 feet.	Quilon, 90 feet.
June 23rd to 30th.....	66°	78½	7¾	0¾	0¾
July	67	78	26¾	3¾	5¾
August.....	64	78½	23	5¾	6¾
September	66	78½	6	3¾	2¼
October	66	78¼	41½	15¼	14
November	65	77½	36½	4½	3½
December	64	78	23	2¼	3¾
Total.....	65½	78½	164	36	36¼

Had the observations extended through the whole year, no doubt the contrast would have been much greater; but, as it is, it is sufficiently remarkable. Above 100 inches of the rain which fell at Uttray Mullay, occurred in the months when the S.W. monsoon is considered to have ceased on the western, or Malabar, coast; and may, therefore, be said to belong to the N.E. monsoon of the Coromandel coast. There appears to have been two occasions when the fall of rain was remarkable in 24 hours—on the 10th of October there fell 9 inches, and on the 26th November there fell 7·35 inches. But there also fell from the 6th to the 10th of October, inclusive, 29·4, averaging nearly 6 inches daily, or more than falls in most of the counties of England in a twelvemonth. General Cullen has also established two pluviometers on the central table-land of Travancore, which is about 30 miles across to the Coromandel site; one at Perregaar at 2,300, and another on the eastern, or Coromandel edge, at an elevation of 3,600 feet. General Cullen considers the area of this table-land to be about 2,000 square miles; much of it at an elevation of 4,000 feet. He states that it is lost to civilization, from the Travancore government drawing only cardamons from it, and rigorously prohibiting culture, to protect their cardamon monopoly. The main features of these observations correspond with those of Mahabaleshwur and Mecara; and testify to one of those benevolent provisions of Nature which the inquirer always meets with, of the continuous imprisonment of aqueous vapour upon mountain masses occasioning very great condensation, and furnishing the permanent sources of springs and rivers. The apparent discrepancy of the comparatively small falls of rain at Chiltoor, situated in the midst of the great gap of Paleghât, confirms this view; for though the vapour is constantly drawing through the gap, it does not meet with any impediment to force it up into a much lower temperature than its own, and is, therefore, only partially condensed. The paucity of rain, however, at Cape Comorin and Varioor, both open more or less to both monsoons, does not admit of a ready solution. If, as General Cullen asserts, the S.W. monsoon beats rather from the N.W. and westerly points than from the S.W., it cannot be said that Ceylon intercepts the vapour from Cape Comorin; and then, why is there a fall of 131 inches and 124 inches respectively at Allopy and Cochin on the open coast, and only 19 inches at Cape Comorin? With respect to the N.E. monsoon, some of its vapour may be cut off from Cape Comorin by shoulders or peaks from the table-land of Travancore, and yet the whole mass of the table-land does not prevent Trevandrum and Quilon from receiving a portion of the N.E. monsoon, as is shown in the preceding table. A closer attention to local physical circumstances is evidently necessary before a rational account can be given of the discrepancies; but General Cullen is too zealous an observer not to work out the question; and I look to being enabled, at a future Meeting to lay before this Section a continuation of General Cullen's observations, and a satisfactory solution of the existing difficulties.

'On the Construction of a self-registering Barometer, Thermometer, and Psychrometer,' by Mr. C. BROOKE.

'On the Fall of Rain in the Lake Districts of Cumberland and Westmoreland, &c. in the year 1845,' by J. F. MILLER.—The writer exhibited a series of registers in tabular form, from which it resulted that at Seathwaite there have been thirty-one days in which the fall was between 1 and 2 inches, five days between 3 and 4 inches, one day between 4 and 5 inches, and one day between 6 and 7 inches. On the 27th of November 1845, there was measured at Seathwaite 6·62 inches, and on the 26th and 27th nearly 10 inches, being the greatest quantity of rain which has ever been measured, in the same period, in Great Britain. At Langdale Head, in Westmoreland, the fall on the 27th was 6·28 inches, and on the 26th and 27th nearly 9 inches. The consequence was, the heaviest flood which had occurred at these places for at least sixty years past. Windermere Lake had not been so high for the last fifteen years; on the night been the 26th and 27th it rose 2 feet in perpendicular height; the quays along the banks of the Lake were immersed in water, and much wood was carried away by the current and lost. Keswick Lake had not been so high since November 30, 1838. Of the total quantity of rain, measured in the Vale of Borrowdale, in 1845, 106·58 inches fell in the months of January, March, August, October, November and December; and nearly 46 inches in the two latter months. Such was the violence of the storm on the night of the 28th of December in the Lake Districts that a number of fish were found next day on the margin of Bassenthwaite Lake, which had been thrown up by the waves in the course of the night by the force of the wind—a circumstance wholly without a parallel, except on the night of the memorable 6th of January, 1839. The rain which fell in the preceding twenty-four hours amounted to 4·22 inches; at Whitehaven the quantity was ·323, or rather exceeding a quarter of an inch. I am enabled also to add returns of the rain fallen in 1845, from several places throughout Great Britain by way of comparison with the quantities measured in the Lake Districts.

	Inches.
Allenheads, Northumberland	50·411
Kendal, } Westmoreland .. .. {	33·346
Cartmel, } Westmoreland .. .. {	53·668
Rampside, } Westmoreland .. .. {	40·289
Tirril, } Westmoreland .. .. {	40·000
Bolton-le-Moors	48·110
Carlisle, } Cumberland .. .. {	31·220
Brougham Hall, } Cumberland .. .. {	35·000
Manchester	41·415
Doncaster	29·198
Highfield House, Nottinghamshire	29·595
Cirencester	29·970
Leeds	23·588
North Shields	26·200
Culloden, Inverness, N.B.	27·632
Applegarth Manse, near Lockerby, N.B. ..	30·32
Arbroath, co. Angus, N.B.	28·211
Liverpool	34·06
Stratton, Cornwall	40·69
Uckfield, Sussex	25·03
Crupingham, Rutlandshire	24·61
Helston, Cornwall	37·00
Kelso, Roxburghshire, N. B.	24·42
Makerstown, near Kelso	21·27

The fall at Seathwaite is more than three times the quantity measured at Whitehaven, one of the wettest localities in the kingdom. It exceeds the fall at Leeds by 6 times, at Culloden by 5¼ times, at Doncaster and Highfield House, Nottinghamshire, by 5 times, at Cirencester and Arbroath by 5½ times, and at Makerstown, near Kelso, by more than 7 times. Seathwaite exceeds Doncaster in January by 15 times, in November by 21 times, and in December by 9½ times. It exceeds the quantity at York in January by 16 inches, or 20 times; in March by 9 times, and in November by 20 times. It exceeded Dublin in March by 14 times, in April by 13 times, in October by 5 times, and in November by 7 times. The quantity measured at Seathwaite and Langdale Head in the month of December (24·02) is more than falls in some places in Great Britain during a year. Mr. Miller added:—It is to be regretted that the meteorology of our lake and mountain districts should have been so long neglected. Prior to the establishment of these gauges, there were none stationed in the lake district of Cumberland, and, so far as I am aware, only two among the lakes of Westmoreland, viz., one at Esthwaite Lodge, and the other at Grasmere: and the largest quantities

measured in any year were 86 inches and 90 inches respectively. And so startling did these results appear, when first made known, that many were led to suspect the accuracy of the instruments employed. But, subsequent investigation shows that these values are exhibited, in some portions of the lake district of Cumberland, only in the very *driest* years. Thus, in the period from July 1844 to June 1845 (which for drought has only found a parallel in the memorable 1826), the fall at Gatesgarth and Wastdale Head amounted to 83·96, and 88·42 respectively, and at Grasmere, in Westmoreland, to 74 inches nearly. But I suspect that meteorologists will hardly be prepared for the discovery that we have localities in our own country, which, even in average years, exceed the amount of rain annually deposited in many tropical climates. Yet such is the almost incredible fact. At Grenada, lat. 12° 5′, the average fall is 126 inches; at St. Domingo, lat. 18° 20′, it is 120 inches, and at Calcutta, in lat. 22° 35′, it is 81 inches. In the past year, the quantity measured in the vale of Borrowdale exceeds the largest of these amounts by 25·87 inches. An inspection of a map of the country in connexion with the table will show, that the wettest portions of the lake district are those situated at the head or eastern extremity of those valleys formed by our highest mountain ridges, amongst which are the Great Gabel, Sca Fell, Glaramara, Red Pike, and Honister:—the first being apparently the grand central point of attraction and condensation for the warm vapour arriving in a south-westerly current across the Atlantic; and it is a remarkable coincidence, that nearly all our lakes bear in the direction of Gabel, so that, if extended onward in a direct line, they would all converge at the base of this mountain. Immense as is the deposit of rain at Gatesgarth, Grasmere, Wastdale, and in other portions of the lake district, as shown in a former table, even these enormous quantities sink into comparative insignificance when compared with the fall at Seathwaite, a small hamlet at the head of the vale of Borrowdale, which exceeds the wettest of the other localities by 27·74 inches, or by one-fourth nearly. Now it is chiefly the deposit in the vale of Borrowdale which supplies the Derwent, and the extensive lakes of Derwent and Bassenthwaite; so that we might *à priori*, have expected to find the greatest amount of rain in this section of the district. The great difference in the fall between places closely contiguous to each other is remarkable: the proportion which obtains between Cunerdale Lake and a farm-house about 1½ mile distant, is as 2 to 1 nearly. Loweswater, Buttermere and Gatesgarth, are all in the same line of valley, surrounded by the same ridges of mountains, and are each distant about 2 miles from the other. Buttermere exceeds Loweswater by 18 inches, or one-fourth; but Gatesgarth, at the head of the valley, exceeds Buttermere by 36·65 inches, or nearly one-half. Here the difference between the head and foot of the valley, in a distance of 4 or 5 miles, is 54·588 inches. But the great increase in the fall towards the head of the valleys is appreciable at much more limited distances. At Wastdale Head I have two gauges, of precisely the same size and shape, and within a quarter of a mile of each other, yet the difference of the receipts, in a single month, sometimes amounts to half an inch. The annexed statement will show that the excess is always in favour of the higher gauge, marked No. 1.—

		No. 1.	No. 2.	Diff.
1845	October	12·35	11·89	·46
	November ..	12·31	11·90	·41
	December	16·18	15·78	·40
1846	January ..	12·97	12·47	·50
	February	6·60	6·58	·02
	March	10·35	10·07	·28
	April	6·59	6·16	·43
	May	3·65	3·44	·21

The current of vapour is apparently only partially decomposed in passing over a flat or even an undulating country; it aims at once for the loftiest heights, passing over the less hilly districts with little diminution of its original weight or volume. But, on reaching the mountain peaks, the sudden change of temperature causes a rapid and continuous condensation, in the form of vast torrents of rain, whilst comparatively little descends on the adjacent plains. As an instance of the low temperature on our mountain tops, I may mention that, on making the ascent of Skiddaw, on the 5th of September last year, the thermometer on the summit, at noon, stood at 41°, —sky overcast, the sun gleaming out at intervals. The temperature of a strong spring, about two miles from the summit, was also 41°. The temperature of the air at the foot of the mountain, at 3h. 30m. P.M., was 58°. Snow not unfrequently continues on Sca Fell till the middle or end of June: we remember seeing a patch on the 15th of June, 1843; and on the neighbouring mountains the air was so intensely cold that we think it could not be more than 2° or 3° above the point of congelation. That the rapid increment in the fall of rain in approaching mountainous districts is owing to the causes above alluded to, and not to the greater number of wet days, is evident on an inspection of the table,—where it will be found that we have as many wet days at Whitehaven, near the level of the sea; indeed, it rarely rains in the lake districts that the day is not also wet, more or less, at the coast. And, in comparing the number of wet days at various places, we not unfrequently find them to obtain in the *inverse* ratio to the fall of rain. Thus, in 1845, they range from 195 to 211 in the lake district; but at Manchester, with a fall of 41 inches, they amount to 235;—at Culloden, with a fall of 27 inches, to 237; but at Kendal, where the quantity of rain is 53 inches, the wet days are only 178. At Carlisle, the wet days are the same as in the lake district, where the fall is four times as much. We are informed by a gentleman, recently returned from India, who was many years medical attendant to the Rajah of Sattarah, that he seldom measured more than 40 inches of rain in the plain; but among the hills, 30 miles distant, the annual quantity reached 350 inches; and as much as 9 inches has been known to fall in twenty-four hours. The utility and beauty of this arrangement is obvious, since the mountain torrents afford a continuous supply of water to the lakes and rivers, which otherwise could scarcely have an existence. The rivers thus called into being, aid the efforts of the husbandman by carrying off the superfluous moisture from the plains, which, without such a provision, would be in danger of stagnating into pestilence.

Dr. LEE presented the following tables to the Section:—

1. 'Meteorological Observations for the year 1845,' made by J. R. CROWE, Esq., the British Consul-General of Norway, residing at Christiania.—These tables are a continuation of others made in 1843, and presented to the British Association at York, and of similar tables made in 1844, and presented to the Association at Cambridge, and which are noticed in the volume of the Proceedings for 1845, at page 19 of the abstracts of communications to the Section of Mathematics and Physics. They consist of observations of the barometer and thermometer, and of the direction of the wind, made, on nearly every day in the year 1845, at the hours—7 A.M., 9 A.M., 2 P.M., 4 P.M., and 10 P.M. with the means of each column for each month, and the mean temperature for each month. The depth of snow is given for the months of January, February, and March, in cubic inches, and the quantity of rain in cubic inches for each of the other months of the year.

2. Meteorological Observations made at Alten in West Finmark, at the Kaafjord Meteorological Observatory, in the years 1844 and 1845, by J. F. COLE, Esq., and J. H. GREWE, Esq. of the Alten Mining Company.—These tables are a continuation of others for the year 1843, presented to the British Association at York, and which have been deemed worthy of notice by Col. Sabine; who has referred to them in a note on his Paper on the Meteorology of Bombay, at page 80 of the Report of the Proceedings at Cambridge, in the volume published in 1845. These tables contain the height of the barometer and thermometer in shade at 9 A.M., 3 P.M. and 9 P.M. with the maxima and minima of the thermometer at 3 P.M. The quantity of rain, or melted snow, the force and direction of the wind, and of the clouds, and the description of clouds, and the proportion of clear sky *at the same hours*. To which are added, tables of the *half-hourly results of all the above observations* on the 21st and 22nd of each month in the year.

3. 'Observations on the Aurora Borealis during the year 1845, made at the Kaafjord Meteorological Observatory, at the Alten Copper Works,' by J. F. COLE, Esq. and J. H. GREWE, Esq.—These tables contain observations upon the position, and the degree of intensity, and the forms of the aurora, which have been made by these zealous amateurs of meteorology, during the months of January, February, March, and April, September, October, Novembe, and December. No observations being practicable during the summer months, on account of the brightness of the daylight during this portion of the year.

'An Account of an Atmospheric Recorder,' by G. DOLLOND.—It having appeared to be desirable, at the last Meeting of the British Association, that a correct self-regulating apparatus should be constructed, by which the various changes of the atmosphere should be recorded upon paper in such manner that they might be referred to at a future period, and having invented an instrument which records the following eight variations, viz.—the barometer, the thermometer, the hygrometer, the electrometer, the pluviometer, the evaporator, the force board, the anemometer, and the time,—I now have the pleasure of offering to the present meeting a few remarks upon the subject, in order that, should the instrument merit their attention, I may enter into an explanation of its various qualities. I have found it answer the purpose for which it was intended, in every way, satisfactorily. 1st. The barometer is registered at every change which takes place in the weight of the atmosphere at every half-hour, and may be traced from one point to the next without any difficulty.—2nd. The thermometer registers the various changes from cold in the night or morning, to the greatest heat in the afternoon, continuously.—3rd. The hygrometer has the power of showing the changes from dryness to extreme saturation of moisture, to every hundredth of the scale, and is extremely steady in action.—4th. The electrometer is acted upon by a conductor, and registers each flash of lightning which comes within the range of the conductor.—5th. The pluviometer registers each drop of rain which falls upon the surface of the receiver, and shows the continuation of the falling quantity for every inch in superficies until the inch is discharged; when it again commences for another inch, which repeats the same course.—6th. The evaporator is so constructed as to retain a quantity of water with the surface exposed, and so guarded that rain cannot enter into the vessel. The surface gradually evaporates, forming a diagonal line upon the paper until an inch is evaporated, when a discharge takes place, and another commences.—7th. The force or power of the wind acts upon a board, 1 foot square, which is registered in pounds and ounces avoirdupois, from 1 ounce to 30 pounds.—8th. The direction of the wind is shown in circles; which, immediately upon inspection, shows the direction of the course or change which has taken place: for instance, if it has passed through the south or the north, from east to west; and the point from which it started and that to which it returned.—All these eight varieties have their scales about half an inch from the marking points, and can be very easily read or referred to. There are markers on each edge of the paper for time, which paper is carried forward by a clock.

Mr. DOLLOND gave an Account of the Storm as shown by this instrument at Camberwell, on the 1st of August, 1846, during his absence. The barometer changed from 30·03 to 29·82 in.; the thermometer from 69° to 98° during the day, or 24 hours. The hygrometer ranged from 39° to 80° of moisture. At 2 o'clock the electrometer was affected by the lightning, and registered 15 discharges or flashes in one hour. At 3h 23m the rain commenced falling; and in 2 minutes the pluviometer discharged an inch, —which had previously stood at 11·90 in. for several days. At 4h 3m another inch was registered, and at 5h 25m a third inch was marked upon the registering paper; and so tremendous was the fall of rain and hail, that at 5h 35m a fourth inch was marked upon the paper, making, on the whole, 3·12 inches in 2h 17m. The force of the wind was equal to 11lb 4oz., and the direction changed from east to west, through the south, at 3h 20m.—The SECRETARY asked the probable cost of one of these instruments.—Mr DOLLOND replied, about 150*l*.

'On the Meteorology of Jersey,' by W. W. CHILDERS.—This communication consisted of tables of hourly observations of the barometer and thermometer; but Mr. Childers was not present, to point out any of the conclusions to be deduced from them.

TUESDAY.

'Report of the Proceedings of the Committee for printing and circulating the Catalogues of Lalande and Lacaille,' by Lieut. Stratford. It merely announced the completion of the printing, and the principle of distribution which the committee had adopted, with a list of the names of public societies and libraries to which they had been given: and stated, that although a sum of 34*l.* yet remained in the hands of the committee out of the 1,000*l.* given by Government, yet it would require that, and about 70*l.* more, to be in their hands to liquidate all the claims upon them;—adding, that although there was little doubt of this being repaid by Government, yet, in the meantime, it would be necessary for the Association to make the advance.

A joint meeting of the Mathematical and Physical Section (A.) and of the Physiological Section (E.), took place to receive the two following communications:—

Prof. Matteucci submitted a *résumé* of his latest researches in Electro-Physiology.—In the first place he described the experiments which prove that the developement of electricity in living animals is a phenomenon peculiar to all organic tissues, and principally to muscular fibres, and that it is a necessary consequence of the chemical processes of nutrition. Prof. Matteucci particularly wished to prove that the developement of electricity in the muscles can never produce electric currents which circulate either in the muscular *mass*, or in the nerves. It is only by a particular arrangement of the experiment that we succeed in obtaining a muscular current. Further, all experiments contradict the opinion of an electrical current existing in the nerves. M. Matteucci proved that the current said to be proper to the frog is, on the contrary, a general phenomenon which exists in all the muscles that have tendonous extremities unequally distributed, and that this current supposed to be peculiar to the frog, is only a particular instance of muscular current.

In the second place, the Professor laid before the Section his last researches 'On Electrical Fishes.'—He showed that the laws of the electrical shock of these animals, are a necessary consequence of the developement of electricity which is produced in each cell of the electrical organ under the influence of the nervous power.

In the third place, Prof. Matteucci showed the relation which exists between the Electrical Current and Nervous Power. He proved that muscular contraction is always produced by a phenomenon analogous to the electrical spark, and that the electrical current does but modify the nervous excitability. On these facts, Prof. Matteucci establishes a simple theory of electro-physiological phenomena.

In the last part of his communication, the Professor treated of Inducted Contraction;—and, after having demonstrated that these phenomena cannot be explained in supposing an electrical discharge of any kind indiscriminately, he concluded, that Inducted Contraction is an elementary phenomenon of the nervous power, which acts in muscular contraction, and is analogous to all actions of induction of physical powers.

'On the Identity of certain Vital and Electro-Magnetic Laws, by Dr. Bullar.—The object of this paper was to show that the direction and formation of blood-vessels, and the capillary circulation through them, which is independent of the propulsive power of the heart, are in accordance with laws identical in their direction and relation to each other with those of the electro-magnetic force. The formation of blood and blood-vessels in the germinal membrane, which surrounds the embryo during the incubation of a hen's egg, was taken as a simple type of this process. The small whitish disk, on the yolk-bag (the cicatricula), is the spot where the vital changes begin. The embryo occupies the centre of this spot, and becomes the centre of the vital force exerted by the mother's warmth. From this centre the force is communicated to the yolk-bag. The disk enlarges, still keeping its circular form, and marked by concentric circles, more or less perfect. The disk is produced by the conversion of the yolk into cells, which adhere as a thin circular layer. The circular *form* of this disk and the general concentric arrangement of the cells were considered to indicate that the lines of vital force which arranged and preserved that form were circular. The next step is the conversion of a portion of these cells which form the disk into blood and blood-vessels. The trunks pass in the direction of radii of the original disk and central germ. The main trunks unite at the central heart, which is at first only a bent portion of the common trunk. The capillaries inosculate at the circumference. Thus the vessels form a complete circle. This circular arrangement of the vessels as radii indicates a second circular force at right angles to the plane of the former one. The next step is the formation of these vessels. Those called by Harvey 'vasa lutea' are coarse, and the stages in their formation are more easily watched. They are formed in the substance of the disk, and out of the same material,—the cells of the yolk. These cells continuing to accumulate, some are arranged as cylinders,—then, in succession, as half-circles, circles, net-work, and trunks converging to the central embryo. At this stage, each vessel is a coarse yellowish cylinder, with a red streak down its axis. Externally it is composed of cells of various sizes, which can easily be brushed off from the transparent tube which they cover; and which is composed of smaller cells, and contains the red blood itself flowing towards the centre. The inference drawn was, that this tube, formed of cells around the current, is the evidence of a circumferential force around the current, arranging the cells as a tube. Such being the relation and direction of the vital force in arranging their forms, it was shown that it was in accordance with the direction of the electro-magnetic force. The law of this double force, which bears on the present inquiry, is, that, in order to act, both currents must circulate,—that is, each must return into itself. That the galvanic force must circulate, is evident from the construction of the simple galvanic cell. The magnetic force accompanying the galvanic obeys the same law. It also circulates, but in a plane at right angles to the galvanic. Dr. Wollaston called it, in consequence, vertiginous magnetism. These two currents are inseparable. They are *directive* forces or *carrying*, according to the condition of the matter on which they act. What is true of the magnetic current round a single wire conveying the galvanic current, applies to two or more wires if put together as a ribbon, or to a slip of metal,—the only difference being the increase of force in the latter instances. If the galvanic wire be bent in a circle, or several wires are arranged so as to form a series of concentric rings, or, which is the same thing, a spiral coil of wire be made, the magnetic force still retains the same direction as in the first instance; but as the whole of the wire acts upon the circle of force, it makes it move through the centre of the ring or coil. If such a spiral coil be placed on iron filings, they arrange themselves in lines, passing through the centre parallel to its axis, and then folding up on either side as radii round the edge, where they meet. These experiments were quoted from Dr. Faraday. Such a spiral coil, through which galvanic force circulates, was considered to represent the disk around the embryo; the iron filings, representing the direction of the capillary vessels, arranged circularly in a plane, at right angles to the disk, by the magnetic force accompanying the galvanic. From comparing the two, the conclusion was drawn that, in both cases, the forces at work obey the same laws: that the formation of a circular living disk, by a central force constantly acting, proves the existence of a circular force around that centre, and is analogous to a flat spiral or disk, through which the galvanic force is circulating; and that this vital force in the disk is necessarily attended by a second circulating force in the direction of radii to it, such as is indicated by the arrangement of vessels to and from the centre. The actual movements of the molecules in this living process are invisible, as it is one of growth; but the form produced is explicable on the hypothesis that the living force acts in accordance with the laws of a force the direction and selection of which have been ascertained. The truth of this analogy is rendered still more probable by the relation between heat and galvanism, discovered by Seubeck. If a current of heat, instead of a current of galvanism, be made to circulate through the spiral coil of wire, it will, like galvanism, develope magnetic currents in the direction of radii to the centre. Now, the mother's heat is the source which supplies power to the embryo. In both these instances—in the metal coil of wire and in the living disk—the force is in the form of heat. In both there is a primary concentric arrangement of matter for the transmission of this force; and in both there is the evidence of a second circular force at right angles to the first. If, instead of the arrangement of the galvanic wire as a flat spiral coil, the rings are arranged side by side, as a spiral *tube* or *helix*, then the second or magnetic force would be through its axis. It would be a tube which, if placed in water, would carry one pole of a magnetic needle, floated on cork, through it; and iron filings would arrange themselves in a circular line going through the helix, round on the outside, returning into itself.—(Faraday). The spiral galvanic force here produces the current through the tube. The converse would be true. It was then shown how these laws were applicable to the formation of vessels. Blood is first formed; and when it circulates a tube is formed around it. The current of blood indicates a force through the axis of the tube: the tube itself indicates a circumferential force around the current to arrange its materials as a tube. The tubes are arranged circularly, meeting at the heart in the centre, and at the capillaries in the circumference. The living tube, if it followed electro-magnetic laws, would have (like the spiral coil of wire through which the galvanic force was circulating) a circular force through its axis: and, conversely, this current would tend to form a tube around itself—supposing always appropriate materials. The vital force has evidently appropriate materials in the form of cells. Those cells, which exposed to oxygen become converted into red globules, are moved in a current: thus showing that they are fit matter for the influence of vital force in one direction, and that such a force is moving them;—whereas the smaller and transparent cells are arranged round the current as a tube: thus showing a second force at work around the first. There is a current in one direction, and a tube around it; neither tube nor current can be explained without the assumption of a moving power: both are readily explained by two circular forces having the same relation to each other as the electro-magnetic. The cells out of which the disk and vessels are built have been regarded so far as under the influence of forces external to them. But each cell has a life and force of its own, similar in kind to the central force, but less in degree. The central force subordinates all lesser forces, and makes the disk *one*. Entomologists have shown that the earliest appearance of organization in the ovules of plants and ova of animals is a cell, and that such cell has a nucleus, and each nucleus a nucleolus, or central spot,—which is the essential part of each cell,—and, though destitute of matter, has the power of forming cells, and arranging them round it. Dr. Barry has shown that each secondary cell becomes, in its turn, the centre of a similar action; smaller ones being generated and arranged round the larger ones. Prof. Goodsir finds that the inner membrane of the tubes of glands is formed of cells, and that nucleated cells are found among them, which he calls centres of nutrition, as if these nucleated cells were the parents of successive broods of young cells passing off from them. These centres of nutrition are here called centres of force; and, according to the law of this force, there would be a common centre, bringing all these isolated centres into one comprehensive whole. The vascular disc of the yolk-bag had been taken as a central fact, the right comprehension of which would explain other facts of the same kind, but more complex. Its application to some few facts in physiology was then shown:—such as the formation of new blood-vessels; the tubular form of vessels and of ducts among cells; of circulation through capillaries, independently of the contraction of their coats, or of the propulsive power of the heart; and of that universal fact that, wherever there is a central heart, there are powers at work, which neither its propulsive power nor capillary action can explain, of forming new vessels in connexion with the old ones. Such a universal fact becomes a law, when the cause is shown. This cause or law, now proposed as the solution of these living processes, is, that the vital force circulating in two directions, one circle being in a plane at right angles to the other,—thus identical in direction with the electro-magnetic force,—will explain the phenomena. Or, in other words,

that wherever there is a central moving force there is a power at work around and to and from that centre, capable of arranging fit matter as tubes, and of circulating fluid to a certain extent through them, and that the tubular formation is owing to a vital power identical in its direction with the galvanic; and the radiated arrangement of these vessels, and the circulation (to a certain extent) of fluid through them, are dependent on a power accompanying the former, and identical in its direction with the magnetic force. The conclusion was not drawn that the vital and electro-magnetic forces were the same, but that the direction and relation of both forces were identical.

Sir J. HERSCHEL said, as the authors had placed before the Sections their opinions of the origin of muscular contractions and motions, he would also mention an opinion of his own, merely in the form of a guess for future consideration. There were three things to be noted in the entire phenomenon;—the first was mental, viz., the determination of the will; the second was an effort, the existence of which became manifest by the consequent weariness; the third was the force which resulted and manifested itself in the effect produced. Now, here it appeared that a link was wanting between the second and third; and to supply that link was the object of the present inquiries. The idea he wished to throw out was, that the individual portions of muscular fibre might consist of something like spheroids inclosed in outer coverings; and that, in the quiescent state of the muscle, these spheroids might all lie with their major axes or longer dimensions along the length of the muscle, and then by an excitation of electric currents around them, caused by the will and consequent effort either circulating through the surrounding tissues or suitable nerves, a reversal of polarity might cause these spheroids to reverse their major and minor axes, and thus cause the entire muscle to swell out at right angles to its previous length.—Dr. CARPENTER stated that by the aid of powerful microscopes it was easy to see, in a properly prepared muscle, that its several distinct fibres were divided into oblong cells. In the act of muscular contraction these cells contracted in their longer dimensions, and were thus forced to swell out in their shorter.

'Account of some new Experiments in Electro-Magnetism,' by Prof. WARTMANN.—Since the discovery made last year by Dr. Faraday of the action of magnets upon polarized light passing through different media, it became interesting to ascertain whether this influence is limited to the rotation of the plane of polarization of the ray. Numerous experiments have shown that no change whatever is undergone by the fixed lines of the spectrum, either in position, or in quantity, or visibility, when they are produced by rays of natural or artificial light, common or polarized, which have been made to go through different substances,—such as air, nitrous acid gas, water, alcohol, oil of turpentine, syrup of sugar, a solution of ferruginous alum, or a long prism of flint glass,—put in the sphere of action of powerful electro-magnets. As far as those researches have been brought, they lead to the conclusion that neither light nor the medium suffers any constitutional derangement which could alter the property of the ray to be partially absorbed when it is refracted through a prism. The view generally entertained by foreign philosophers as to the real action of the magnet being one upon the material substance which gives way to the luminous ray, it became necessary to test whether the new magnetical state of molecular equilibrium would not be concordant with some new properties of chemical affinity. Indeed, it has long ago been asserted by Ritter, Fresnel, Hansteen, Murchmann, Lodecke, Murray, and others, and more recently by Mr. Hunt, that the magnets have a decided influence upon chemical phenomena. I have taken advantage of powerful electro-magnets, which are put in action by sixty pairs of Bansen's battery, to make some fresh trials upon the subject, convinced that such means would afford me an opportunity of witnessing, if any, far more decisive actions than those which have been described. But all my attempts have proved unsuccessful to produce any difference in the electrolysis of acidulated water, of ferruginous dissolutions, or in the electro-chemical decomposition of sulphate of copper, or of acetate of lead by soft iron. All the results have been carefully and repeatedly tested by accurate weighings; and in the case of the electrolysis of water, I employed electrodes of soft iron, gilt by electrical process and supported by the very poles of the magnets, with the interposition of a film of mica as thin as possible. The apparatus has been placed in all directions relative to terrestrial magnetism, and the poles of artificial magnets have been made to act both separately and together, without any different result whatever. But in expressing this my opinion I must add, that I mean not to say that magnetism is not able to interfere with molecular disposition, which is a quite different view of the subject, that has not, perhaps, been sufficiently distinguished by the former one. Indeed, we have ample evidence that this is the case under favourable circumstances. These experimental inquiries have led me to ascertain two facts, which it may, perhaps, not be improper to state here. If a chemical action is produced by the immersion of two pieces of soft iron into a liquid which is able to corrode them, or to be decomposed by the metal, and if the poles of a magnet be applied upon these cores, an electro-magnetic rotation takes place all round each, which is in the sense of the hypothetic current of Ampère.—Prof. Grove has just pointed out to me that such an action had been stated by Dr. Christie, though, as far as I know, it has been referred to by no treatise on electro-magnetism, and that he himself had witnessed the phenomenon many times. The other fact seems to be of a higher interest, since it discloses, as it were, to the eye what may be called the lines of chemical affinities. I shall now content myself by merely describing what I have been able to witness, and to show to many scientific men,—reserving for a future occasion to complete this communication, and to dwell upon the theoretical part of the subject. Common sulphate of copper is to be dissolved in water, and a cylinder of soft iron shall be deposited in it. As soon as the first deposit of copper has taken place, it is easy to perceive all round the cylinder light films of a blue matter, which are extending themselves as diverging rays from the very centre of the cylinder, which may be thought to represent the centre of the chemical action. I suppose this substance to be a subsulphate of copper, and Prof. K. Rosé is of the same opinion; but from want of time and scarcity of matter I have not yet been able to submit it to analysis. During its manifestations proceeding, the nature of the liquid is always varying, sulphate of iron taking the room of a corresponding quantity of sulphate of copper. When this change has reached a certain extent the phenomenon ceases to widen more. It is then like to a large passion-flower, with slender stamina, terminated by a continuous circular and opaque edge of thick antheræ. Its description, which is altogether independent of the nature and the form of the vessel, is very geometrical. After half an hour, more or less, this extraordinary design fades, by the deposition of the matter at the bottom of the trough. When two cylinders are used in the same plate, two of the rays meet, perpendicularly, each other, on the line of shortest distance of the centres. Others join in direction more and more oblique, and, being totally deprived of the faculty of entering their relative dominions, they incurve themselves in hyperbolic arches. Thus a perfectly straight line is formed, which cuts into two halves the line of shortest interval. It is scarcely necessary to add, that the rays which are not to meet others extend as in the first case described. With three centres situated at the summit of an equilateral triangle, the lines of separation intersect each other in a point, which is at equal distance from the summit, and thence run perpendicular to three sides of the triangle. The diverging rays, opposite in two directions, are much inflected. The whole of the figure is perfectly regular. These rays are not affected in their developement by the magnetization of the cylinders;—at least, if one observation made on this point suffices for pronouncing upon it. If there are but two cylinders, and if they are lifted up in the liquid by means of an appropriate horse-shoe magnet, it is possible to move them very slowly without any disturbance of the whole of the figure,—and particularly without the least incurvature of the line of separation, which follows the cylinders backwards and forwards, as if firmly tied together. But a shock loosens all those particles geometrically adherent: they fall down and all design vanishes.

'On the Deviation of Falling Bodies from the Perpendicular,' by Prof. OERSTED.—I shall give a short history of these experiments, as far as this can be done by memory, without any assistance of books. The first experiments of merit were made, I think, in 1793, by Prof. Guglielmini. He made bodies fall from a height of 231 feet. As the earth rotates from west to east, each point in or upon her describes an arc proportioned to its distance from the axis; and, therefore, the falling body has, from the beginning of the fall, a greater tendency towards east than the point of the surface which lies perpendicularly below it. Thus, it must strike a point lying somewhat easterly to the perpendicular. Still, the difference is so small, that great heights are necessary for giving only a deviation of some tenth parts of an inch. The experiments of Guglielmini gave indeed such a deviation; but at the same time, they gave a deviation to the south, which was not in concordance with the mathematical calculations. Laplace objected to these experiments, that the author had not immediately verified his perpendicular, but only some months afterwards. In the beginning of this century, Dr. Benzenberg undertook new experiments, from a height of about 240 feet. The book in which he describes his experiments contains, in an appendix, researches and illustrations upon the subject from Gauss and Olbers; to which several abstracts of older researches are added. The paper of Gauss is ill printed, and therefore difficult to read; but the result is, that the experiments of Benzenberg should give a deviation of 395 French lines. The mean of his experiments gave 399; but they gave a still greater deviation to the south. Though the experiments here quoted seem to be highly satisfactory in point of the eastern deviation, I cannot consider them to be so in truth; for it is but right to state that these experiments have considerable discrepancies among themselves, and that their mean, therefore, cannot be of great value. In some other experiments made afterwards in a deep pit, Dr. Benzenberg obtained only the easterly deviation; but they seem not to deserve more confidence. Greater faith is to be placed in the experiments tried by Prof. Reich in a pit of 504 feet, at Freiberg. Here the easterly deviation was also found in good agreement with the calculated result; but a considerable southern deviation was observed. I am not sure that I remember the numbers obtained; but I must state that they, though not in the same degree as those of Dr. Benzenberg, were means of experiments which differed much among themselves. Prof. Reich has published his researches. An abstract is to be found in Poggendorff's Annalen de Physie. After all this, there can be no doubt that our knowledge upon this subject is imperfect; and that new experiments are to be desired, but these are so expensive, that it is not probable that they would be performed with all means necessary to their perfection without the concurrence of the British Association. I will here state the reasons which seem to recommend such an undertaking. 1. The art of measurement has made great progress in later times, and is here exercised in great perfection. 2. All kinds of workmanship can be obtained here in the highest perfection. I think it would not be impossible to have an air-tight cylinder, of some hundred feet high, made for the purpose. This would, indeed, be expensive, but it would present this advantage,—that the experiments could be made in a vacuum and in different gases. 3. With these experiments, others could be connected upon the celerity of the fall, and the resistance opposed to it by the air, and by gases. Prof. Wheatstone's method for measuring the time would here be of great use. 4. If the southern deviation should be confirmed, experiments could be undertaken, in order to discover in how far this could be effected by magnetism in motion. For this purpose bulbs of different metals might be tried. Very movable magnetical needles, well sheltered, but placed sufficiently near to the path of the falling bodies, would indicate magnetical effects induced in them.

Sir J. HERSCHEL said, that from a conversation with Mr. Gersted he had been inclined to think that the deviation of falling bodies towards the south in these northern latitudes—which was an observed fact, although hitherto unaccounted for—might receive an

explanation from the circumstance that electrical currents were known to be in circulation round the earth in the direction of parallels of latitude; and as a current is always excited in a body moving across such a current, these would give rise to a mutual repulsion, causing the deflection towards the south. But inasmuch as their action would be but momentary were the velocity constant, and is developed in proportion to the variation of the velocity, hence, since the velocity increases uniformly with the time, a uniformly-acting force is the result; and the total deviation, therefore, towards the south would be in the proportion of the height from which the body descended, since it is easy to see that its entire course would be rectilinear. This fact, therefore, which could readily be determined by well conducted observations, would be a decisive test of the soundness of the opinion; and this was the chief object which M. Oersted had in view. From a conversation, however, which he since had with Mr. Grove, he was inclined to be more doubtful of this explanation. Mr. Grove said, that inasmuch as a falling body was moving between electrical currents, placed both north and south of its line of fall, in his opinion the effect of the one would counterbalance that of the other, so as together to produce no effect.—M. Oersted said that his present object was merely to induce competent persons to undertake well-directed experiments for ascertaining whether there truly was a southerly deviation of falling bodies or not.

'On the Results of an extensive series of Magnetic Investigation, including most of the known varieties of Steel,' by W. Petrie.—The following is an abstract:—

Process of manufacture to produce permanent magnets, having the greatest fixity and capacity conjointly secured.—1. The original iron should be the purest soft iron, *charcoal made* (not coke); the Swedish, from the *Dunnamore* mine, is better than any other. 2. Converted—with pure *charcoal*; it should be carbonized *lightly*, and the process to be stopped when the bars, of the usual thickness, are "*scarcely steel through*," yet so that it will harden with certainty, without an undue heat. 3. Sorted—with attention to homogeneous conversion, &c., according to the ordinary rules. 4. Melted—the pot kept covered, and not longer than necessary in fusion. 5. Cast—into a large ingot, so as to allow of its being *well* rolled out singly, before it becomes reduced to the requisite thinness. 6. Rolled—while hot from casting, to save a second heating; it should not be doubled over, nor sheared and faggotted; the rolling should be conducted at as low a temperature as convenient, as it thereby acquires a harder, closer texture, and finer grain. 7. In cutting into shape, the substance (if large or of varied form) should not be strained, as by boring with "*rymers*," or straightening (oftener than is unavoidable) with the hammer, as it is then apt to warp, and to have unseen commencements of cracks on becoming subsequently hardened. More carbonization than that previously described as best is of little injury to the magnetic goodness of the steel, provided it be so prepared as to preserve a homogeneous and *white* appearance of fracture when hardened, which is not so easily managed as with that of lower carbonization; but if it be again carbonized *more* than usual (as razor steel, or above that), it rather improves; and again an increase deteriorates it as in cast iron, and a further increase again improves it. In short, *in the scale of carbonization there is a succession of continually decreasing maxima of advantage.*

On the physical properties which the steel should possess.—The fineness of grain is affected by many adventitious circumstances, which must be considered and allowed for in judging of it; and the most important fact is the difference between the appearance in the *hard* and *soft* states; for in the general properties, whether optical, mechanical, or magnetical, their order, in any set of samples, is *reversed* in the hard state, independently of the absolute change in each property. The steels should be examined by breaking with a *single* bend at a file notch (notching with a chisel, bending back, &c., change the appearance). A microscope of 6 or 10 lineal power is better than any other power for examining it. The *general* properties, without going into detailed description, should be as follows, the terms being comparative with other samples of less value, and not at all with the hard or soft states of the same steel:—

In a soft state.	*In a hard state.*
General appearance, uniform darkish grey.	Uniform white.
Rather a large grain, compared with razor steel (or finer if much rolled).	A smaller grain than it was before.
Rather irregular in size and shape of grain, unless fine. Rounded crystallization.	Rather more regular than before. *Rounded* crystallization disappears. Grains individually distinct, with good metallic lustre.
Close texture, without cavities.	Not particularly close.
Rather tough for steel.	Brittle, and very hard.
Attracted considerably before magnetizing.	Ditto.
Loses induced magnetism more freely than other steels.	Retains magnetism well and abundantly.

Care must be taken to discriminate between real cavities and indentations arising from the crystals being torn up by the breaking; pure iron often appears porous from this cause.

Then followed some peculiar considerations on the chemical constitution and molecular arrangement of certain sorts of steel; and on the molecular peculiarities of iron and other metals, in connexion with their magnetic capacity, illustrated by a tabular arrangement.

On hardening, &c.—In the ordinary process there is risk and difficulty for large work, owing to unequal heat, unnecessary time and heat applied, especially to fine edges, decarbonization, scaling, &c. These are obviated by a process which is new, as applied on a large scale, namely, heating in melted lead. It will be observed that the *precise* heat is imparted, quite uniformly, in half a minute or so; and the finest edge is heated momentarily no higher than the thickest part, rendering this process incomparable for all instruments where it is the edge or smaller parts that are of importance. *No scale is formed*, the finest polish or sharpest edge being preserved through the hardening. The previous preparation of the steel and some other points are described; and particulars of the manner of refrigeration in water (salt), and for securing hardness and great evenness, are also detailed. The process has been applied to steel sheets of 10 inches by 20, obtained quite flat, and as hard as a file throughout, even at the middle parts, which has hitherto been found very difficult—we may say impossible. Magnets, prepared by these means only, differ generally in magnetic power by $\frac{1}{10}$ part, many being absolutely equal. Particulars are then given of the advantage of certain high powers for magnetizing bars, and of an apparatus constructed, weighing 2 cwt., and possessing nearly as great aggregate power as the colossal magnet in possession of the Royal Society (weighing, we believe, 2 tons). A method is suggested for verifying the constancy of magneto-meteorologic instruments, by means of the terrestrial magnetism itself, independently of its own variations, or of the comparison of the mutual action of three or more bars.

'On the Mode of Developing the Magnetic Condition,' by Dr. Scoresby.—Dr. Scoresby stated that he had, at York, shown a new and superior mode of developing the magnetic condition in properly prepared and hardened steel bars, by interposing a thin plate of soft iron between the operating magnet and the bar of steel to be magnetized. He had, at that time, suffered it to be necessary to extend the thin plate of soft iron the entire length of the bars of steel to be magnetized. But he had since found this to be by no means the case; since by laying any number of unmagnetized bars of steel in a long line, and passing along them a horse-shoe magnet with its poles connected with a thin polished plate of soft iron (he used common hoop iron), the ends being slightly bent upwards to cause it to pass more freely over the steel bars, and then turning them over and renewing the process on the other face, he found he could communicate to the bars the full charge which they were competent to receive. The Rev. Doctor exhibited this experiment; and by simply passing a horse-shoe magnet thus armed with an interposed piece of sheet iron, once over each face of twelve previously unmagnetized bars of steel, he communicated to them so much power as that they sustained their own weight, when held up as a chain.

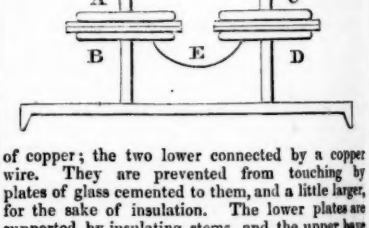
Mr. Brown said, that if Dr. Scoresby, or some other equally competent person would turn his attention to the influence of alterations of temperature on the power of a magnet, or could discover some means of rendering the power of a magnet independent of the ordinary changes of atmospheric temperature, he would confer a benefit on persons engaged in magnetic researches.

'On a New Portable Equatoreal Stand for a Telescope, by Dr. Green.—Described, *ante*, p. 429.

'On a New Portable Azimuth Compass,' by Mr. Dent.—Mr. Dent exhibited this instrument. The magnetic needle was suspended in an inner case, and that again fitted in an outer case in such a manner as to admit of having either its ends reversed so as to eliminate errors of centering; or its faces reversed so as to eliminate the error of culmination.

'On a New Dark Eye-piece, and a New Mode of Contracting the Aperture of the Object Glasses of Telescopes,' by Mr. Lawson.—Mr. Lawson described the several failures which he had experienced while endeavouring to protect the eye from the violent action of the sun's light and heat. At length he succeeded, by prolonging the eye tube beyond the glasses, and placing in the side of the prolongation a slit capable of admitting the coloured plate glasses to be introduced or withdrawn. By this position being assigned to them, he found that they answered the end required effectually; while they were themselves placed in a position where the concentration of the heat and light upon them could not, in the slightest degree, injure them. He described several spots which he had observed on the sun's disk last spring. His method of contracting the aperture was by an outer tube sliding on the eye-piece tube, something like the spray tube of a common telescope. This, by being drawn out into the tube, more or less, will stop off more or less of the cone of rays proceeding from the object glass to the eye-piece.

'On a new Multiplying Condenser,' by A. F. Svanberg.—The author was led, by the process used by M. Pfaff, of Kiel, in his researches on the electricity of contact between metals and fluids, to construct a new instrument, which, by a single contact of zinc and copper, can be charged by manipulation, requiring only a minute of time to an intensity sufficient to give a brilliant spark and strong shock. It consists of two ordinary condensers, whose plates are



of copper; the two lower connected by a copper wire. They are prevented from touching by plates of glass cemented to them, and a little larger, for the sake of insulation. The lower plates are supported by insulating stems, and the upper have insulating handles. For an instance of its use, suppose the first condenser has received a small positive charge—*a*. Raising A and touching C with the finger, D will become negative, and C positive by induction. Remove the finger from C to D, the electricity of this last is retained by that of C; and at the same time replacing A, which had not lost its electricity during the preceding operations; that of B can be transported to D by a repetition of the process. By three such operations the tension of D's electricity is tripled; and this can be transferred to B by raising C and touching it. In this way it is obvious that, by three *n* manipulations, the final electricity $=3^n a$. It is easily seen, that there is a certain number of transfers before changing, which gives the greatest result. Thus, with two transfers and three changes $2^{12} a = 4096\ a$; while three (which is the best number of transfers) gives, with the amount of manipulation, $3^8 a = 6561\ a$; four transfers gives $4^6 a = 4096\ a$. Such an instrument, made for the Cabinet de Physique, at the University of Upsal, of 6 inches diameter, gives, by 24 manipulations, a strong spark, and a shock felt in the elbows.

'On the Meteorological Observations at Kew;

with an Account of the Photographic Self-registering Apparatus,' by Mr. F. Ronalds.—Mr. Ronalds, on presenting his third annual volume of 'Observations and Experiments made at the Kew Observatory,' described his experiments on the photographic self-registration of the electrometer, the barometer, the thermometer, and the declination magnetometer—explained his existing apparatus for these purposes—and exhibited the resulting photographs; but first briefly adverted to his previous proposals in 1840 and 1841, and experiments in 1844, relative to the subject. The principal characteristic of his improved system is a peculiar adaptation of the Lucernal Microscope. An instrument of this kind was employed in July, 1845, to register the variations of Volta's *Atmospheric Electrometer*. The pair of straws were properly insulated, and suspended within the body of the microscope, and towards its object end. A condensing lens was placed at the end itself, and a good lamp stood beyond that. A strong light was, therefore, projected upon those sides of the straws which were turned towards the condensing lens, and the other sides were in deep shade. The light also impinged upon a little screen, fitted into the back of a case, about two feet long, fixed to the eye-end of the microscope, at right angles with it, and vertically. Through this screen was cut a narrow curved slit, whose chord was horizontal, and radius equal to the length of the straws. Between the electrometer and the screen a combination of achromatic lenses, by Ross, was adjusted to produce a good chemical focus of the electrometer, at a distance as much beyond the external surface of the screen outwards, as the thickness of one of the plates of glass to be presently mentioned. In the long vertical case was suspended a frame, about half the length of the case, provided with a rabbet, into which two pieces of plate glass could be dropped, and these brought into close contact by means of six little bolts and nuts. The frame could be removed at pleasure from the line by which it was suspended; and the line, after passing through a small hole stopped with grease at the top of the long case, was attached to a pulley, about four inches in diameter, on the hour arbor of a clock. Lastly, counterpoises, rollers, and springs were used for insuring accurate sliding of the frame, &c. A piece of Mr. Collen's photographic paper was now placed between the two plates of glass in the moveable frame; the long case was closed so as to prevent the possibility of daylight entering it—the clock was started, and the time of starting noted. All that part of the paper which was made to pass over the slit in the screen, by the motion of the clock became now, therefore, *successively* opposed to a strong light, and was consequently brought into a state which fitted it to receive a dark colour, on being again washed with the usual solution, *excepting* those small portions upon which dark images of the lower parts of the straws were projected through the slit. These parts of course retained the light colour, and formed the long curved lines or bands, whose distances from each other at any given part of the photograph, *i. e.* at any given time, indicated the electric tension at that time. Sometimes daylight was used instead of the light from a lamp; and in that case, during the process, some appearances of the sky were occasionally noted, by which it was evident that in serene weather, when the sun's light and heat varied, and the paper became consequently either more or less darkened, the electric tension, as shown in the photograph, varied also, increasing with the increase of light, &c. This fact has not, perhaps, been before observed—but as the darkening effect on the paper could not be always depended upon, separate notes were taken of the intensities of light, and the same results obtained. At the suggestion of the Astronomer Royal, a *Distinguishing Electrometer* formed on the dry pile system, was afterwards employed, which exhibited in the photograph not only the tension, but the kind of electricity possessed by the electrometer at any given time. The *dry thermometer* was next tried. It was of the horizontal kind, had a flat bore, and its tube was introduced through the side of the microscope. The tube had a diaphragm of narrow aperture fixed upon it, and the slit in the screen at the eye-end of the microscope was now, of course, straight and horizontal. The image was a little magnified, and the breadth of the dark band or line in the photograph became the measure of temperature inversely at any given time.* The *barometer* employed was of the syphon kind. The microscope was turned in order to bring the long case and its sliding frame into a horizontal position. The clock was placed at one end, and a little weight, sufficient to keep the frame steady, was suspended by a line passing over a pulley at the other. The lower leg of the barometer was introduced through the now *bottom* of the microscope; it was provided with a similar kind of diaphragm to that on the thermometer, and of course the slit in the screen was now vertical. A light blackened pith ball rested on the surface of the mercury, and its image was slightly magnified: it will in future be much more so. The *declination magnet* was one of two feet. It was provided with a damper, and its mode of suspension was *essentially* similar to that of the Greenwich Declinometer. In order to adapt it for self-registration, a light conical brass tube, projecting six inches beyond its north end, was affixed to the lower side of the spur which carried it; and to the north end of that tube a small wire, called the index, was attached at right angles. This index descended through little slits in the bottoms of the two cases which inclosed the magnet, &c., and took the place of the electrometer described above in the Lucernal Microscope, which was placed below the cases, and was now required to be much longer than before, in order that the image and motion might be sufficiently magnified, yet a flat field retained. Every thing was fixed very firmly. A great many photographs were obtained, and sent for inspection to Greenwich. Concerning some *term day impressions* Mr. Glaisher, the Magnetical and Meteorological Superintendent of the Greenwich Observatory, says that, "The beautiful agreement of those results with these at Greenwich is highly satisfactory." Mr. Ronalds stated that Mr. Collen's paper is found the best adapted to the purpose of any which he has tried.

Mr. Broun described a simple method of recording the excursions of the declination needle which he had adopted. He attached to its extremity a fine pointed wire, standing at right angles to the plane in which the axis of the needle traversed; a sheet of paper, with fine iron filings sifted over it, was carried along by clockwork over this pointer; the result was that a line of particles of iron was removed from the path of the pointer. This line was afterwards fixed indelibly on the paper by immersing it in a solution of galls; for a dark ink stain was formed on all the rest of the paper; that line alone remaining white.

'On some Meteorological Phenomena,' by Prof. Wartmann.—Although many attempts have been made of late to extend our knowledge of the electrical phenomena of the atmosphere, it must be confessed that much remains to be done. The frequency of the flashes of lightning, according to the latitude and to the seasons, is a subject of inquiry, which has been recommended by M. Arago. It would also be interesting to record the duration of thunderstorms, the number of flashes of each of the two classes which have appeared, the height and general appearance of the clouds and the hygrometric state of the atmosphere. I shall take the liberty to point out some facts which I have had occasion to witness on the evening of the 1st of August last. After many hot days, clouds appeared on the south-west part of the horizon of Lausanne, and when over the town they began to be illuminated almost without interruption. I counted more than forty flashes in twenty-two minutes, two-fifths of which were of the first class, and all going eastward. A flash of such a white brilliancy that the eye could not bear it, but the appearance of which was perfectly definite, did *not* disappear suddenly, but left a phosphorescent trace of a dark red colour, like to the illusions of the dissolving views and the *traînées* or trails of certain shooting stars, which I observed on the night of the 10th of August 1838. Another flash of the first class appeared at the underpart of the clouds, and after a rather long course it vanished at the very edge of it: no thunder was heard. Two flashes were bicuspidated; three others were tricuspidated at some distance from their origin; two of which appeared together, one over the other, in the same horizontal position. Are those flashes as scarce as it is generally believed? Are they produced by a particular state of humidity, which makes the state of the air better conductors on many given directions simultaneously than in others? This I am not able to decide; but I think that the quantity of rain which happens to fall during a thunderstorm, has a great influence upon the falling of the electrical fluid. Indeed, in a recent instance, a thunderbolt fell in a low part of a vintage near Lausanne, burning all the stems on an area of more than eighty feet square, during a shower of the most tremendous character, and without being attracted by more elevated conductors which were at a short distance; and, on the contrary, two years ago, during a storm which was accompanied by no rain, the thunder fell on the spot, and burned by ricochets stems here and there upon a surface of more than four acres.

'On a New Anemometer,' by Dr. Banks.—The instrument is worked by a vane supported on a hollow wooden shaft, about two inches diameter, whose upper end is supported by slight friction rollers, and the bottom rests on a fine steel pivot. Each of two levers holds a pencil, one for the direction of the wind working in a spiral of three turns, which, by a very simple contrivance, returns to its position, if the wind moves round the compass with frequency. The other lever is acted upon by the force-board attached to the vane, and which, in its retirement from an increasing wind, raises a series of weights together with a disk upon which, by a roller, the lever rests. The instrument is about two feet and a half long, by two feet high, exclusive of the vane which is attached to a tin tube of length according to circumstances.

'Meteorological Observations made at Aden, in the Red Sea, and at Bombay,' by Serj. Mayes, of the 17th Regiment.—These consisted of several tables of barometer, thermometer, and dew-point observations, drawn up with care and diligence.

Section B.—CHEMISTRY AND MINERALOGY.

Sept. 21, 1845.

Fairy Rings.—In your notice of my paper, there are two mistakes to which I should wish to call your attention. The first is unimportant,—being merely the addition of a letter to my name. You have it Wray, instead of Way. The other mistake is in the analysis;—the Phosphoric acid is set down at 20 per cent., instead of 29. This error is annoying, as it makes me guilty of some glaring absurdities in the eyes of chemists. I see, also, that there are other mistakes in the statement of the analysis. I have sent a correct copy of it; and should feel obliged if you can, in your next number, make the necessary corrections. J. Thomas Way.

Analysis of the Ash of the Agaric of the Fairy Rings.

Silica	1·09
Lime	1·35
Magnesia	2·20
Peroxide of Iron	a trace.
Sulphuric Acid	1·93
Carbonic Acid	3·10
Phosphoric Acid	29·49
Potash	55·10
Soda	3·32
Chloride of Sodium	0·41
	98·69

MONDAY.

'On Comparative Analytical Researches on Sea Water,' by Prof. Forchhammer.—In the ocean between Europe and America the greatest quantity of saline matter is found in the tropical region, far from any land; in such places 1,000 parts of sea water contain 36·6 parts of salt. This quantity diminishes in approaching the coast, on account of the masses of fresh water which the rivers throw into the sea: it diminishes, likewise, in the westernmost part of the Gulf stream, where I only found it to be 35·9 in 1,000 parts of water. By the evaporation of the water of this warm current, its quantity of saline matter increases towards the east, and reaches, in N. lat. 39° 39′ and N. long. 55° 16′, its former height of 36·5. From thence it decreases slowly towards the north-east: and sea water, at a distance of from sixty to eighty miles from the western shores of England, contains only 35·7 parts of solid substances; and the same quantity of salt is found all over the north-eastern part of the Atlantic, as far to the north as Iceland, always at such a distance from the land that the influence of fresh

* In order to convert this into the wet bulb hygrometer, nothing, of course, is necessary but the application of the usual cup of water and the capillary threads.

water is avoided. From numerous observations made on the shores of Iceland and the Faroe Islands, it is evident that the water of the Gulf stream spreads over this part of the Atlantic Ocean;—and thus we see that the water of tropical currents will keep its character even in high northern latitudes. In the longitude of Greenland, and more than 100 miles to the south of the southernmost point of that large tract of land, sea water contains only 35·0 in 1,000 parts. In going from this point towards the north-west, it decreases constantly; and in Dover Straits, at a distance of about forty miles from the land, it only contains 32·5 parts of salt in 1,000 parts of sea water. This character seems to remain in the current which runs parallel to the shores of North America; and at N. lat. 43½° and N. long. 46½° the sea water contained only 33·8 parts of salt. Thus tropical and polar currents seem not only to be different in respect to their temperature, but also in the quantity of salt which they contain; and thence it follows, again, that while the quantity of water carried away from the *tropical sea* by evaporation is greater than that which rain and the rivers give back to that sea, the reverse takes place in the *polar seas*, where evaporation is very small and the condensation of vapour very great. The circulation must on that account be such, that a part of the vapour which rises in tropical zones will be condensed in polar regions, and, in the form of polar currents, flow back again to warmer climates. Although my analyses are only made on water from the ocean between Europe and America, yet little doubt can be entertained that also that part of the ocean which separates America from Asia is in a similar condition; and that currents flowing from the poles are the rule, and currents flowing towards the poles the exception. Besides the southerly direction, which any current flowing from the northern polar regions must take, it will, according to well-known physical laws depending upon the rotation of the earth, always take a direction towards the west, and thus be driven towards the eastern shores of the continents; while any tropical current flowing towards the north will, according to the same laws of rotation, take a direction towards the western shores of the continents. This is at present the case in the Atlantic Ocean; and its effects upon the shores of Europe, which by a branch of a tropical current are surrounded by warm water, produce a mild and moist climate. The water of the different seas is much more uniform in its composition than is generally believed. In that respect my analyses agree with the newer analyses of atmospheric air in showing that the differences are very slight indeed. Sea water may contain more or less salt,—from a very small quantity, as in the interior part of the Baltic, to an amount of 37·1 parts in 1,000 parts, which I found in water from Malta, and which is the greatest quantity I ever observed; but the relative proportion of its constituent saline parts changes very little. In order to get rid of those differences which might arise from the different quantity of saline matter in sea water, I have compared sulphuric acid and lime with chlorine, and the following results are the mean of many analyses:—In the Atlantic, the proportion between *chlorine* and *sulphuric acid* is 10,000 to 1,188; this is the mean of twenty analyses, which differ very little from each other. In the sea between the Faroe Islands, Iceland, and Greenland, the same proportion, according to the mean of seventeen analyses, is 10,000 to 1,193. In the German Ocean, according to ten analyses, it is 10,000 to 1,191. In Davis's Straits, according to the mean of five analyses, it is 10,000 to 1,220. In the Kattegat, according to the mean of four analyses, 10,000 to 1,240.—Thus it appears that the proportion of sulphuric acid increases near the shores: a fact which evidently depends upon the rivers carrying sulphate of lime into the sea. The proportion between *chlorine* and *lime* in the Atlantic Ocean, according the mean result of seventeen analyses, is 10,000 to 297; and in the sea between Faroe and Greenland, according to the mean of eighteen analyses, 10,000 to 300. Lime is rather rare in the sea around the West Indian Islands, where millions of coralline animals constantly absorb it,—the proportion, according to five analyses, being 10,000 to 247; and it is rather copious in the Kattegat, where the numerous rivers of the Baltic carry a great quantity of it into the ocean. The proportion is there, according to four analyses, 10,000 to 371.

'On the Changes which Mercury sometimes suffers in Glass Vessels hermetically sealed,' by Prof. Oersted.—It has been frequently noticed that mercury inclosed in glass tubes, even when those tubes were hermetically sealed, undergoes a remarkable change. It first becomes covered by a thin film of a yellow colour, which adheres to the glass, and becomes eventually nearly black. This has been attributed to oxidation; but the oxidation which would arise from the exceedingly small quantity of atmospheric air which could be contained within the bulbs exhibited by Prof. Oërsted was too small to account for the formation of such a quantity of dark and yellow powder as many of them exhibited. Prof. Oërsted referred the change on the mercury, to the action of that metal on the glass of which the bulb was formed. It appears that sulphate of soda is frequently employed in the manufacture of glass; and it is thought that a sulphuret of mercury is formed by the decomposition of the glass itself. This is not, however, proved; and it has only been brought forward that attention might be directed to a subject which appeared to involve some remarkable conditions.

Mr. Hunt observed that if glass was exposed to the influence of the solar rays, a molecular change was induced on the surface; and that if the glass was exposed to mercurial vapour, and then, with the vapour upon it, set aside for a few days, the mercury entered into combination with the glass, and left a permanent stain upon it.—Mr. Pearsall remarked on the condition in which glass apparatus is frequently found, from the influence of mercury upon it.

'On a Second New Metal, Pelopium, contained in the Bavarian Tantalite,' by Prof. H. Rosé.—In a former communication it had been shown that the so-called Tantalic acid which occurs in the Bodenmais in Bavaria, consisted of two acids—one of which differed materially from all known acids. To this, Prof. Rosé gave the name of Niobium, regarding it as a new metallic oxide. After a most elaborate investigation, Prof. Rosé has found that the other acid contains another oxide of a metal differing from Niobium, and to this metal he has given the name of Pelopium from Pelops, the son of Tantalus, and the brother of Niobe. The Tantalite of Bavaria is, therefore, now shown to contain three metals—Tantalium, Niobium, and Pelopium. These differ from each other in specific gravity, and they exhibit different and peculiar chemical properties.

'On Crystallography and a New Goniometer,' by Dr. Leeson.—This new system of crystallography was, during the last session of the Chemical Society, brought under the notice of that body; and in the Memoirs published by the same Society, Dr. Leeson's new system will be fully explained. His goniometer consists in adapting to a microscope a polarizing prism. The crystal observed through this polarizing eye-piece, of course, presents two faces instead of one; but, by turning the eye-piece until these two angles are made to correspond, the true angle of inclination from the axial line is obtained—and its value is read off from a graduated circle within which the polarizing arrangement moves.

'Analysis of the American Mineral Nemalite,' by Prof. Connell.—This mineral bears a striking resemblance to asbestos, so that by the eye it can hardly be distinguished from it. It was first chemically examined by Mr. Nuttal, who ascertained that it differs entirely in constitution from asbestos; and concluded, from his experiments, that it consists essentially of magnesia and water, with a little oxide of iron and lime. It was subsequently examined by Dr. Thomson, according to whom it also contains 12½ per cent. of silica. The constituents found by the latter were—

Magnesia	51·721
Silica	12·568
Peroxide of Iron	5·874
Water	29·666
	99·829

The result which I have obtained differs somewhat from both the preceding. According to both the previous experimenters the mineral is soluble in acids without effervescence. But I have found that even perfectly fresh portions of the specimens which I have of the mineral from Hoboken, in America, sensibly effervesce when dissolved in acids, showing some carbonic acid to be contained in it. I have also found only a very minute quantity of silica, the mineral leaving scarcely any residue when dissolved. The amount of water was determined by ascertaining the quantity of water collected by ignition in a tube of German glass twice bent, and containing at one end fused chloride of calcium. The carbonic acid was estimated by the loss of weight on treating a portion of the mineral with dilute acid, in a little bottle connected with a tube containing chloride of calcium. The solid constituents were determined by ordinary methods. The result was—in 100 parts—

Magnesia	57·86
Protoxide of Iron	2·64
Silica	0·80
Water	27·96
Carbonic Acid	10·
	99·46

Considering the protoxide of iron to replace a little magnesia, the mineral appears to be a combination of hydrate of magnesia and hydrated carbonate of magnesia. The formula

$$5\,MgO.\,HO + MgO.\,CO_2.\,HO$$

will nearly express its constitution, and gives—

Magnesia	61·67
Water	27·24
Carbonic Acid	11·09
	100.

The native hydrated carbonate of zinc (*zinkblüthe*) is a mineral of analogous constitution.

'On Cavendish's Experiment respecting Re-production of Nitric Acid,' by Dr. Daubeny.—Dr. Daubeny stated the result of some experiments he had instituted with the view of ascertaining whether the production of nitric acid by electricity, as was first effected by Cavendish, really arose from the direct union of oxygen with nitrogen, or was produced indirectly through the presence of minute portions of ammonia. For this purpose he deprived the air, through which the electrical sparks were to be passed, of water and of any traces of ammonia that might have been contained in it, by allowing it to stand in contact with concentrated sulphuric acid for some time previous to the commencement of the experiment. Even in this case, although the air had been in contact with no liquid except the mercury over which it was confined, the usual diminution of volume took place after the electrical sparks had been passed through it, and solution of litmus when introduced into the tube became sensibly reddened. Hence the author infers, that nitrogen does combine directly with oxygen, as it is now known to do with carbon; but he still questions whether it can do so with gaseous hydrogen, since ammonia cannot be formed, as nitric acid is, by means of electricity, and as in all the cases in which ammonia has been produced artificially one of the elements appears to have existed in what is called a nascent state. But if nitrogen can be made to combine directly with oxygen, how comes it that, through the operation of thunderstorms, the composition of the whole atmosphere has not before this time been changed by the production in it of considerable quantities of nitric acid? This the author explains by the small amount of heat generated by the union of the two gases; owing to which only those particles combine which lie contiguous to *the line of the electrical spark*: whereas, in other cases, as in that of the union of oxygen with hydrogen, so much heat is generated by the union of those particles which are affected by the passage of the electrical spark, that a condensation of other portions of the mixture results, whence will arise an union of more of the particles and an extraction of a larger amount of heat. In this way the explosion propagates itself through all parts of the mixture with a rapidity which causes it to be considered by us as instantaneous. In all cases, however, in which gaseous elements that can remain together without acting upon each other are made to unite, the *modus operandi*, whether it be by electricity, heat, or (as in the case of porous bodies) by adhesive affinity, appears to be the same; that is, such a condensation of the respective gases as shall bring their particles within the sphere of their mutual affinity.

Report 'On Crystalline Slags,' by Dr. Percy and Prof. Miller.—The formation of crystals of remarkable regularity and beauty in the slags of the iron furnaces, and also in the slags from the copper smelting, has long excited curiosity; but, until the present time, no attempt has been made to account for their

production, under the singular circumstances in which they are formed—often at the highest temperature of the iron furnaces. At the York Meeting, Dr. Percy and Prof. Miller, undertook to investigate this matter. The crystallographic department has rested with Prof. Miller, and the chemical examination has been confided to Dr. Percy. At this meeting, many slags were exhibited, of which the analyses were given,—and also the measures and angles of the crystals. These analyses will all appear in the 'Transactions' of the Association. The important bearing of this inquiry on geological phenomena was strikingly pointed out. By it a clue may be obtained to many of the curious crystalline formations which have been points of dispute amongst the most eminent cultivators of geological science. These crystals are found, many of them, to be quite analogous to natural crystals,—and they have, in both cases probably, been formed alike under the influence of intense heat. The Report is not complete; and it is the intention of the authors to extend the inquiry much further than they have yet been enabled to do. They solicit from the manufacturer crystalline slags for examination; and it is their intention to examine the amount of impurities a crystal may contain without losing its native character.

'On the Electricity of Tension in the Voltaic Battery,' by J. P. Gassiot.—In 1843, I communicated a paper to the Royal Society. I therein described some experiments made, in order to test the relation of the electrical and chemical actions which take place before and after the completion of the voltaic circuit. Amongst the various voltaic arrangements I then used, was an extensive series of the combination which has been generally denominated the water battery;—the metallic elements of which are copper and zinc, and the exciting liquid rain-water. With 3,520 pairs, a continued series of sparks is obtained; and, although three years have elapsed, the battery is at this time nearly as energetic in its action as at first,—merely requiring to be refilled with water from time to time as it evaporates. This was the only arrangement of the voltaic battery, by which I was then enabled to exalt the effects of tension, so as to obtain the electrical spark before contact of the terminals;—although, with the assistance of an exceedingly delicate gold-leaf electroscope, I, at that time, elicited distinct signs of tension in a single cell of Grove's nitric acid battery, and subsequently in one of copper and zinc, charged with sulphuric acid. But in all the different series of experiments described in the paper to which I have referred, I invariably found that the higher the chemical affinities of the elements the greater was the development of the effects of tension. For instance, to produce a certain extent of tension with the gas battery of Grove, when charged with oxygen and hydrogen, ten or twelve pairs of cells were required,—with hydrogen and chlorine, six pairs,—with chlorine in a single tube, and amalgamated zinc as the positive element, two pairs;—and, while it took sixteen cells of my water battery to produce a given effect on the electroscope, ten of the same cells, when charged with dilute acid, produced the same effect in the same instrument. The static effects of a voltaic battery are very feebly developed, except when the battery is insulated; and the difficulties of insulation in an extended series are at all times great. In the battery, excited by acid solutions, these difficulties are much increased, in consequence of the conducting power of the liquids: still they are not insurmountable;—and, as of all the batteries hitherto constructed the nitric acid battery of Grove is composed of elements of the highest chemical affinity, I determined on constructing one in which the effects of tension should be heightened to the extent of exhibiting the spark before the circuit was completed,—which I hoped to accomplish without being compelled to extend the series to any extraordinary number, as I had done in the water battery previously described. For this purpose I had 100 glass cells constructed 3 inches deep, with stems 7 inches long; the zinc of each series was attached to a slip of platinum foil; each cell was carefully charged in the usual manner (but only half full) with strong nitric and dilute sulphuric acid; and great care was taken that the outside of each cell with the stem was perfectly dry. To the terminals of this battery, I attached the copper plates of my micrometer-electrometer,—described in a former paper of the 'Philosophical Transactions, 1840.' On approximating the plates of this instrument to about $\frac{1}{1000}$th of an inch, a series of minute sparks took place, and in a few seconds the usual voltaic arc was produced. This arc could then be elongated to the extent of half an inch, in consequence of the particles of the copper having passed between the plates. If, in lieu of the copper plates, pieces of charcoal be similarly approximated to $\frac{2}{1000}$ths of an inch, the arc is at once produced, instead of the sparks as from the discs,—the loose particles of the carbon being more easily detached by the force of tension, and consequently at once producing the arc. I believe that this is the first instance in which a *true spark* has been obtained from so small a series of the voltaic battery.

MONDAY.

SECTION C.—GEOLOGY.

'On the Applicability of M. Fauvelle's Mode of Boring Artesian Wells to the Well at Southampton, and to other Wells, and Sinkings for Coal, Salt and other Mineral Beds,' by Dr. Buckland.—M. Fauvelle's system was described in Section G. on Friday, and reported [*ante*, p. 973.] Dr. Buckland recommended that the boring on Southampton Common should be continued by M. Fauvelle's method until the upper greensand was penetrated. He stated that there was great probability of obtaining a more abundant supply of water; but that it would rise no higher in the shaft than the level of the nearest outlet at Otterbourne, where the water of the chalk found its escape. The water contained in this subterranean basin of the upper greensand was chiefly derived from the districts where it appeared at the surface. As far off as the Vale of Pusey and Petersfield, within these limits, and beneath the whole of the Hampshire basin, this deposit was probably a stratum of sand and water resting on impervious beds of clay (*gault.*) The level at which this water would stand in the chalk above had been found to vary on account of the *retardation* which it experienced in making its way through the country to the lowest level at which it could find an outlet. From the observations of Mr. Clutterbuck, it appeared that the water stood gradually higher in passing from Southampton to Basingstoke, being about a foot higher for every mile.

Mr. Vignolles recommended the combination of the Chinese percussion mode of boring with M. Fauvelle's system of getting rid of the *débris* produced in the boring.

Prof. Forchhammer read a paper 'On Sea Water, and its difference in various Currents,' and tried to show what influence a change in such currents might have had upon the climate of the North of Europe; since, from the inquiries of Prof. Steenstrup and Lovén respecting the changes in the forest-trees and marine animals indicated a slow increase of the mean temperature of Northern Europe. To account for this, he supposed the British Channel to have been closed, and a polar current to pass over the lower parts of Northern Russia into the Bothnian Gulf, and thence into the German Ocean. The separation of England from France was supposed to have taken place in recent times; and without quoting the zoological evidence collected by British naturalists, he would refer to physical features,—such as the various changes which the Rhine and the Scheldt suffer at their mouths, and which even the smallest rivulet on the western shore of the Cimbrian Peninsula assumes. These rivers turn their mouths towards that side from which the tide comes,—one having, in historical times, changed its mouth more than thirty miles to the south. The mouth of the Rhine has been known for about 2000 years; and since the time of the Romans, when it flowed straight towards the north, where at present the Luiderrea is, it has been seen constantly turning towards the west. From this change, he inferred a change in the direction of the tide,—which he supposes to have arrived formerly at the coast of Holland from the north, instead of from the west, as at present. The marshes on the southern and eastern sides of the German Ocean become broader in proportion as they approach the mouth of the present Channel; a circumstance the very reverse of what might have been expected under present circumstances, since the clay is never deposited when there is any considerable motion in the water. On the contrary, if the Channel were shut up, then the present locality of the marshes would be that best adapted for their formation:—from which he infers that the principal marshes were formed before the opening of the Channel. The earliest accounts of the Channel date from the fourth century B.C., and at the time of Alexander the Great, we find that news about a very great inundation in the northern countries (the Cimbrian flood) had reached Greece; and a tradition still existing in Jutland combines such a flood with the opening of the Channel. Along all the western part of the Cimbrian Peninsula occurs a bed of pebbles, and in some places of rolled pieces of the clay of the marshes, which must be ascribed to an inundation washing away the lighter materials. This inundation the author regards as that of which both history and tradition speak; and he thinks it was occasioned by the first opening of the Channel. These changes were in close connexion with a depression of the greater part of Northern and Western Europe; which is indicated along the coasts of Denmark and England by submerged forests and peat-mosses. At the shores of the Dukedom of Sleswig a *tumulus* has been found in a submerged forest; it contained knives of flint, and shows that the subsidence took place after the country was inhabited. The continuous elevation of the North of Europe would lead to this result,—that the White Sea, in times not far remote, would flow over the lower parts of Russia and Finland, bringing cold water and masses of ice, into the German Ocean, then a bay receiving its waters also round the northern coast of Scotland, which must have materially influenced its climate, making it colder than it is now.

Sir H. De la Beche contended that the separation of England from the Continent had not been a violent movement; but one brought about by causes operating during a long period of time: *breakers* must have been chiefly instrumental in removing the materials which once filled up the Channel.—Dr. Buckland also doubted whether the separation of the Straits of Dover had taken place within the historic period.—Mr. Lyell stated that there had been several oscillations of level since the present chalk cliffs existed, which must have been considerable, since it allowed of the formation of the Elephant bed at the base of the cliffs at Brighton; in which the remains of that animal were imbedded together with those of whales. He considered the period of separation from the continent not historical, but indefinitely remote.—Mr. Forbes remarked that Prof. Forchhammer seemed to have confused the deposits of several distinct periods. In many parts of this country and in Ireland there were beds of sand and clay containing shells of molluscous animals mostly now inhabiting our seas, but very inferior in number to those now living, and equivalent to the group now found on the coast of Labrador. Above these were the submerged forest, and higher still another series—such as had been discovered in the basin of the Clyde, containing an assemblage of fossils, all recent; and many of them eminently characteristic of the present climate.

'Notices of Natural History Observations made since last Meeting bearing upon Geology,' by Prof. E. Forbes.—The principal facts communicated were the following:—1. The discovery, in a living state, of several species of Mollusca hitherto known in this region only as fossils. *Leda pygmæa*, *Arca raridentata*, and *Astarte Withami*, were the instances, all taken by Mr. M'Andrew and Mr. Forbes in the British seas. They had also taken the *Turbinolia Milletiana*, till lately a characteristic miocene fossil, alive, off the Land's End, and had proved the animal to be scarcely different from *Caryophyllia*. 2. The dredging from deep sea at a distance from land, of several species known only as fossils in Europe, as *Leda obtusa* and *truncata*, and *Pecten Islandicus*. 3. The observation that several rare species now living in our seas appear at a comparatively recent period to have been much more abundant; and the inference that they are now gradually dying out, which leads to the probable conjecture that many of the late tertiary forms became extinct within the historic period. 4. The observations of the existence of limited tracts, usually of considerable depth, at various points in the British seas, the marine inhabitants of which are much more arctic in character than those generally diffused through this region.

'Notice of some Tertiary Rocks in the Islands stretching from Java to Timor,' by J. B. JUKES.—Behind the town of Coupang, in the Island of Timor, the land rises in gently sloping hills to the height of 5 or 600 feet,—the nature of which is exposed in a narrow precipitous valley. These cliffs and the shore itself are composed of a very recent tertiary formation, which appears to be a raised coral reef, abounding in *Astræa*, *Meandrina* and *Porites*, with shells of *Strombus*, *Conus*, *Nerita*, *Arca*, *Pecten*, *Venus* and *Lucina*. On a ledge about 150 feet above the sea, Mr. Jukes found a *Tridacna* two feet across, bedded in the rock, with closed valves—just as he had often seen them in the barrier reefs. The thickness of this formation was, probably, several hundred feet; and it seemed to spread far and wide over the country, wrapping round the central mountains, which were lofty, and probably volcanic, peaks. Samou Island appeared to be wholly composed of this rock, often forming precipices 200 or 300 feet in height. Sandalwood Island presents a lofty coast of cliffs and hills, rising 2,000 feet above the sea, and attaining a still greater elevation inland. All the coast cliffs were regularly stratified in thick horizontal beds; white when fresh broken, but weathering nearly black. The cliffs and precipices of Sumbawa are equally lofty, and exhibit the same regular bedding. The island of Lomboch slopes gradually from its southern shore to a great conical volcanic mass, 11,400 feet high, which towers from its north-east corner. The southern coast-cliffs, about 200 feet high, were composed of a white, horizontally-stratified rock, covered by a considerable thickness of brown and yellow thin-bedded rocks. The island of Madura was found to be composed of the same white, chalk-like strata; this island rises in one or two terraces into slightly undulating plains, with groups of flat tabular hills, often rocky and precipitous, and occasionally 1,000 feet above the sea; on the opposite side of the Straits of Madura these these hills continue some distance along the north coast of Java. They are wholly composed of limestone, probably tertiary; and resemble the coral rock of a fringing reef, having a similar black, rugged and honeycombed surface, and white interior, sometimes crystalline, at others earthy and powdery, and occasionally exhibiting a coralline structure. Within the delta of the river Kediri, there are small island-like masses of the same rock; and in one of these were nodules of chert and coarse earthy limestone, with small bivalve shells (*Cyclas*, or *Cyrena*.) Along the south coast of the eastern end of Java are some great calcareous formations, containing fossils which were noticed by Dr. Horsfield in his geological map of Java. From all these particulars, the author concludes that a great tertiary formation of very recent origin—and being, in fact, but a raised fringing reef—clings to the flanks of all the volcanic islands from the east end of Timor to the west end of Java; and that, narrow as these islands are in proportion to their length, their actual volcanic portion is confined within still narrower limits; and huge as are the piles of volcanic materials gradually accumulated in some of the mountains, they owe a good part of these materials, and their elevation also, to a comparatively recent period in the earth's history, during the existence of creatures now living on the earth.

'Sketch of the Geological Structure of Australia,' by J. B. JUKES.—This document was chiefly drawn up from the author's own observations during four years, in which he had opportunity, as naturalist of H.M.S. Fly, of seeing the greater part of the Australian coast. Along the eastern coast there is one continuous line of hills, extending from Bass's Straits to Cape York in Torres Straits, a distance of 2,400 miles; beyond which it is prolonged in rocky islands up to the coast of New Guinea. This chain has a granitic axis, flanked by metamorphic and palæozoic rocks in the south, as described by Count Strzelecki. From Port Bowen, in lat. 22° 30′, the author's own observations commenced. The coast everywhere consisted of schists, porphyries and basalts; at Cape Upstart granite occurred, and was extensively developed on the coast to the northward, and far into the interior, forming hills 4,000 feet high. North of Cape Melville, the granite almost disappeared; and instead, great masses of porphyry with feldspathic, quartzose and metamorphic rocks composed all the headlands and islands. This line of coast appears to cut obliquely through a chain having granite for its axis, flanked by porphyries and metamorphic rocks. On the south-east coast, the crest of the main chain lies 70 or 100 miles from the shore, leaving a considerable space, which is occupied by stratified rocks, consisting of palæozoic shales, sandstones, &c. The same rocks are found on the western flank of the chain, in the district of Port Phillip, and its coal-beds exist at Western Port. On the south-east coast granite shows itself in the bed of the Bogan, just before it enters the Darling, and in the upper parts of the Glenelg. South of the Murray, it forms the north and south ranges of the Pyrenees, the range of Mount Byng, &c. The great mass of the Grampians, more than 4,000 feet high, is composed of sandstone similar to that of Sydney; south of which are a number of volcanic cones and vast sheets of lava. Over all the lower parts of the country, from Port Phillip to the Murray, is spread a great tertiary formation, abounding in shells, echinoderms, and corals. At Cape Jervis, South Australia, the rocks consist of mica-slate, gneiss and clay-slate; and at Adelaide of coarse chlorite schist, and about Gawler Town, blue clay-slate prevails. Veins of copper and lead abound in the various ranges. The interior appears to consist everywhere of tertiary clays and sandstone; which also form the coast, for 600 miles, from Streaky Bay on the east to Mount Ragged on the west of the Great Bight. About Mount Ragged granite is again seen; and frequently forms hills to the west, whose bases are concealed by the tertiary. From King George's Sound, an elevated district runs northward at least 250 miles, consisting of granite, metamorphic rocks, gneiss, &c. Between this district and the sea, is a low plain, 20 miles wide, of recent tertiary rocks, which extend northward to the islands forming the western boundary of Shark's Bay, forming the whole western coast of the Swan River Colony. Along the north-west coast from Shark's Bay to Dampier's Land is a vast tract of flat country, scarcely raised above the sea level, and fronted by dunes of sand. Between Collier's Bay and Cambridge Gulf is a great promontory of stratified sandstone like that of Sydney.—The next portion of the coast described from personal observation is that at Port Essington, which consists of a red or white ferruginous sandstone, horizontally stratified. This formation seems also to extend round the whole Gulf of Carpentaria, as far as the Victoria River. The sandstone abounds in ferruginous concretions, which sometimes compose its entire mass, which then looks like the refuse of an iron-furnace, or part of a lava-stream. These masses form the headlands and projecting points of the cliffs. On account of their similarity to the tertiary sandstones of Port Phillip, the author infers their similarity in age. In concluding, the author remarks the parallelism of all the known mountain chains in Australia, the majority being N.N.E., and S.W., and none varying more than two points from north and south. He also cites the opinion of Capt. Sturt, that one vast desert plain stretches from the great Australian Bight to the Gulf of Carpentaria; and observes that the only great extent of country unaccounted for, is on the north-west side, where the range between Cambridge Gulf, and Buccaneer's Archipelago may rise into some importance in the interior.

SECTION D.—ZOOLOGY AND BOTANY.

'On the Vertebrate Structure of the Skull,' by Prof. OWEN.—Prof. Owen commenced by referring to his previous definition of a typical vertebra, or primary segment of the endo-skeleton [*Ath.* No. 986, p. 969]. He considered that the bones of the skull consisted of a series of four such segments;—but before entering into the details on which his conclusions were founded, he reviewed the previous classifications of the cranial bones, from the early anthropotomical one into those of the *cranium* proper and those of the *face*, to the latest classification by M. Agassiz, based upon the embryological researches of Dr. Vogt. With regard to the division into bones of the cranium and those of the face, he observed that, this having been originally founded upon the exclusive study of the most extremely modified skull in the whole vertebrate series,—that of man, the characters of such primary divisions were artificial, and applicable to the same bones in only a small proportion of vertebrata. Thus the facial series in fishes includes an extensive system of bones—the lugoid—of which part only, viz., the "styloid" element, is admitted into the skull by the anthropotomist, who describes it as a process of the temporal bone—this "temporal" bone being, as Prof. Owen showed in his previous communication [*Ath.* p. 988], originally and essentially an assemblage of bones, which are always distinct in fishes and reptiles, and all of which appertain to distinct natural systems or groups of bones, though so strangely blended for a special object into one osseous mass in the human subject. The petrous process (petrosal) is the spinal capsule of the acoustic organ; the mastoid process is the transverse process (parapophysis) of the parietal vertebra; the styloid process is the proximal piece (pleurapophysis) of the hyoid arch; the tympanic or external auditory process is the modified proximal element of the mandibular arch; the squamous process (squamosal) is a diverging appendage of the maxillary arch. Amongst the bones of the head might be recognized in most vertebrate animals some belonging to the system of the splanchno-skeleton, and some to the dermo-skeleton; those of the endo-skeleton constituting the chief and most important part of the skull, Prof. Owen believed, with Ohm and Bajanus, to be naturally arranged in a series of segments, each consisting of an upper (neural) and a lower (hæmal) arch, with a common centre, and usually with diverging appendages. The bones entering into the composition of each segment had, in fact, the same relative position, and were similar in number with those of the typical vertebræ of the trunk—the excess in number arising from subdivision of peripheral elements; he should, therefore, continue to apply the name vertebra to these segments. Homologists differed as to the number of cranial vertebræ; and the skull might differ, like the neck, the back, and other regions, in different animals, as to the number of its vertebral segments, but Prof. Owen had not seen good evidence of a greater or less number than four, in which he agreed with Bajanus. He enumerated these segments in a direction contrary to those of the trunk, because, like the vertebræ of the tail, they lose their typical character as they recede from the trunk: the chief condition of these terminal modifications being the circumstance of the contained nervous axis shrinking and receding centripetally at both its ends. He retained for the cranial vertebræ the names applied to them, in conformity with those given by the anthropotomist to their neural spines, viz., *occipital*, *parietal*, *frontal*, *nasal*; the upper or neural arches of each he termed, respectively, *epencephalic*, *mesencephalic*, *prosencephalic*, and *rhinencephalic*; the lower or hæmal arches were the *scapular*, the *hyoidean*, the *mandibular*, the *maxillary*; the diverging appendages of these hæmal arches are, respectively, the *pectoral*, the *branchiostegal*, the *opercular*, and the *pterygoid*; the maxillary arch likewise supporting, in higher vertebrata, a *zygomatic* appendage, for its more complete fixation. The special homology of the pectoral fins of fishes with the fore-limbs of quadrupeds was indicated by Aristotle, and first definitely pointed out, in later times, by Artedi. Geoffroy St.-Hilaire had devoted special memoirs to the determination of the bones of the pectoral fins; but had no knowledge of the primary homology of the pectoral fin as the radiated appendage of the inferior arch of a cranial vertebra, or of its serial homology with the branchiostegal and opercular fins. He consequently spoke of the junction of the scapular arch to the cranium as something very strange. Ohm's latest published idea of the essential nature of the arms and legs is, that they are no other than "liberated ribs." Carus, in his ingenious endeavours to gain a view of the primary homologies of the locomotive members, sees in their several joints repetitions of vertebral bodies—vertebræ of the third degree. But Prof. Owen remarked, that such transcendental analyses sublimated all differences, and definite knowledge escaped through the unwarrantable extension of the meaning of terms. He recognized a vertebra as a natural group of bones forming a primary segment of the skeleton; in each segment he also recognized a centrum, a neural arch, a hæmal arch, with sometimes diverging appendages: each of these were parts of a vertebra, and each different parts; to call them all "vertebræ" was to abdicate the power of appreciating and expressing their differential and subordinate characters. With regard to the term "rib," though it might be

given to each moiety of the hæmal arch of a vertebra, Prof. Owen would restrict it to that part of such arch to which the term "vertebral rib" is commonly applied; but, admitting the wider application, yet the bony diverging and backward projecting appendage of such rib or arch was a different thing from the part supporting it. Arms and legs might be developements of costal appendages, but were not the ribs themselves liberated,—although liberated ribs might perform analogous functions, as in the serpents and draco volans.

Prof. Agassiz regarded this paper as one of the most important contributions to philosophical anatomy that had hitherto been adduced. In this study there was one difficulty, and that was the distinguishing between analogies and homologies. According to Prof. Owen's views, he did not see how it was possible to regard Amphioxis as a vertebrate animal. Another point which he could not reconcile with those views was, the existence of the branchial arches upon the hæmapophyses of the vertebræ of the head. If Prof. Owen was right, then much of the anatomy of the osseous system of the lower animals must be done over again.—Prof. Owen pointed out the application of his views to the structure of the Amphioxis; and explained with regard to the branchial arches. These he regarded as belonging to the visceral system, and as essentially connected as a skeleton of the animal. This he proved by their origin, their histological character, and their homologues in other animals.

'A few Notes on the Land Mollusca, Zoophytes and Algæ of the Isle of Wight,' by W. Thompson.—The object of this communication was, to inform naturalists visiting the island, what species they might expect to find in the classes indicated; which are less known than the other departments of its natural history. Rare and interesting species were noticed, and the localities where they had been obtained by the author, particularized. Freshwater bay, and the adjacent coast to the east of it, were stated to be the best localities for the marine invertebrate animals and algæ.

'Zoology of Lough Neagh, compared with that of the Lake of Geneva,' by W. Thompson; the insects by A. H. Haliday.—The respective areas of the two lakes, and their physical, &c. differences being first noticed, a comparison was given of as many portions of the subject as the published memoirs on the zoology of the Swiss lake afforded, including the birds, fishes, mollusca, and certain families of the insecta. A brief notice of the *crustacea* and *annelida* of Lough Neagh, and some remarks on the botany of its shores and waters, concluded the paper.

'On an undescribed Alga allied to *Coleochæte minuta*,' by Prof. Allman.

'On the Structure of *Cristatella mucedo*,' by Prof. Allman.—In this beautiful little Bryozoon, added to the Irish Fauna by Prof. Allman, several interesting peculiarities of structure were detailed. Of these the author considered one of the most important to be the detection of a small roundish body, situated at the upper end of the pharynx, and which he believed to be a nervous ganglion. The author also dwelt upon the existence of a delicate calyciform membrane which unites the bases of the tentaculæ, and is of very general occurrence among the freshwater Bryozoa. This structure he considered peculiarly interesting, as it tended with other facts to homologize the muscular system of the *Bryozoa*, with the branchial disk of the true *Ascidiæ*. Several peculiarities in the digestive and muscular systems were also alluded to, the muscular fibre being shown to be obscurely striated, and to exhibit a tendency to break itself into disks. The ova in their young state are inclosed in a ciliated membrane, and the hooked spines with which, in their more mature condition, they are furnished, are developed within the ciliated investment, during of subsequent growth, but yet fully formed previously to the ova quitting the parent. The facts detailed in the present communication were assumed by the author as affording much additional evidence in favour of the molluscan nature of the *Bryozoa*.

Prof. Owen regarded this as an important paper. It was, however, difficult to say what we must regard as a mollusca; and, therefore, it is difficult to assign the affinities of the mollusca. The supposed affinity of this animal to the rotifera, was evidently wrong; there was, however, an analogy which had misled. The observations made on the muscular tissues of this animal by Prof. Allman were interesting.—Dr. Carpenter had always thought that the Bryozoa occupied a position intermediate between Polyps and Mollusca. He could not, however, agree with Prof. Allman, that the little mass at the mouth of the animal was nervous.—Prof. E. Forbes stated his conviction that these animals were more nearly related to the Mollusca than to the Polyps.

'On the Embryogeny of the Palmograde and Ciliograde Acalephæ,' by J. Price.—This paper consisted of a great many observations made by the author on the various forms of Acalephæ, whose habits and history he had observed whilst the animals were in confinement. The nutrient canals of Cydippe differed from those of Alcinæa and Beroe. Cydippe has a double set of tentacula, which are strap-shaped, and a peculiar jumping motion. Cydippe is the prey of Beroe. The author could not regard the bodies usually called eyes as organs of sight. The modes of reproducing the young and their habits, in these animals, were then described.

Sub-Section E.—ETHNOLOGY.

Dr. R. G. Latham in the chair.

Mr. Jukes read a brief notice 'On the Aborigines of Newfoundland.'—His information on this race he stated to be derived from Mr. Peyton, who possessed, of all men now living, the best opportunities of personal knowledge of them. According to Mr. Peyton's opinion, the red men of Newfoundland were the same race as the Red Indians of North America; and they were certainly not at all allied to the Esquimaux race, whom they held in the greatest abhorrence, while on the contrary they carried on a friendly intercourse with the Indians on the coast of Labrador, to whom the last remnants of the race have passed over, and they, probably, are incorporated with them.

Dr. Latham offered a few remarks on a Newfoundland Vocabulary.—He stated that the philological evidence corroborates the opinion advanced by Mr. Jukes, the vocabulary having a strong affinity to that of the Red Indians, and being quite different from that of the Esquimaux.—Dr. King stated that he had held the contrary opinion, and from historical evidence, going as far back as the period of Sebastian Cabot, he had come to the conclusion that they were really an Esquimaux tribe; nor did he think the evidence now adduced sufficient to alter his former opinion.

Dr. Latham read a paper, by Prof. Von Middendorf, containing 'Ethnological Notes on Siberia.'—In this paper the geographical boundaries of the different tribes were set forth, and the tribes were enumerated, and some of the characteristic peculiarities described. The 1st was the Ostiaks: these were stated to be of Finnish origin, on both physiological and philological evidence. 2nd. The Samoides, who were of Mongol descent. 3rd. The Tunguses. 4th. The Yakuts—the extent to which Mongol features were found in a nation speaking a language akin to Turkish—was insisted on. 5th. The Yukagins; the physical peculiarities of which placed them along with the Samoides. 6th. The Ainos; these were the inhabitants of the Kinule Islands at the mouth of the Arnun; of these there were two types, the Finnish and the Japanese. 7th. The Kachkell: these were known only through the Ainos.

Mr. Jukes read a paper 'On the Varieties of the Human Race in the Neighbourhood of Torres Straits.'—The author stated that in the years 1843, 4, 5, he had visited Australia, Java, Malacca, Singapore, the Islands of Torres Straits, and the coast of New Guinea; he was much struck with the differences in the races of men inhabiting those countries; he divided them into three distinct people: 1st. The Malay races; 2nd. The Papua; 3rd. The Australian. The first race is characterized by physical, social, and intellectual superiority over the others; being, in many places, a handsome, well-formed people, with considerably advanced institutions, navigators, and agriculturists. The second or Papuan races are decidedly inferior, in person, institutions, and arts, although they are much superior to the Australians, who are characterized by the lankiness of their lower extremities; their hips, thighs and calves being remarkably straight and slender, with prominent eye-brows and thick lips, and their social and intellectual condition appearing to be the very lowest. The characters and habits of the three races were described in detail and contrasted.

Dr. King read a few notices of the following tribes; viz. the inhabitants of Port Essington,—on the Tasmanians,—on the inhabitants of Princes Island,—and on the natives of the neighbourhood of Cape Bonny.

Dr. Latham read a paper, by Prof. Retzius, 'On the Distribution of Round and Elongated Crania.'—Skulls are characterized by the greater developement of the *Tubera Parietalia* giving a round or square form to the developement, or of the *Tuber Occipitale* giving an elongated form to the head. To these types the characteristic skull of diverse nations are to be referred. Prof. Retzius denominates the former *brachycephalous*, the latter *dolichocephalous*. To this character he adds that derived from the form of the profile; when the jaw projects he applies the term *prognathous*, when it is perpendicular he uses the term *orthognathous*. The nations pre-eminently *dolichocephalous* are the Celtic, the Gothic, the Greek and Roman; the *brachycephalous* are the Laps, the Fins, and the Sclavonians. The paper contained an enumeration of the principal races of the continents and Polynesia, distinguished by the characters above stated.

Section F.—STATISTICS.

The Secretary read a paper, contributed by Dr. Guy 'On the Duration of Life in the Members of the several Professions, founded on the Obituary Lists of the Annual Register.'—The following table exhibits the average of such as had attained or outlived the specified ages:—

Age.	Army.	Navy.	Clergy.	Law.	Physic.	Learned Professions.	Fine Arts.	Literature and Science, English.	Literature and Science, Foreign.	Trade and Commerce.	General average of England and Wales.	Nobility and Gentry.	Casper's Table of Medical Profession.
26 and upwards	65·27	67·63	68·81	66·20	65·36	67·70	64·42	66·49	62·78	68·11			58·00
31	67·07	68·40	69·49	68·14	67·31	68·06	65·96	67·55	66·72	68·74			59·27
41	68·97	70·01	71·82	70·20	70·23	71·24	68·21	69·15	68·42	71·01			63·82
51	71·58	72·62	74·04	72·78	72·95	73·62	71·15	72·10	71·44	72·32	75·64	74·00	68·21

If we confine our attention to the last line of the table, we shall see that the duration of life among the higher classes is shorter than that of the mass of the people of England and of the provident members of the labouring class. In every age the navy possesses a very slight advantage over the army. The longevity of the clergy is superior to that of any of the other learned professions. The less favourable duration of medical life, in the Tables published by Prof. Casper, of Berlin, is to be attributed to his having included a lower grade of the professions than those whose deaths are recorded in the Annual Register, probably such a class as the general body of medical practitioners in England. Both, however, show that medical men encounter the most danger at the early part of their professional career, and this is more apparent when the column of medical life is compared with that of law life. From his own and other tables Dr. Guy constructed the following summary of deaths at 51 and upwards:—

English males .. .. 75·64
Clergy .. .. 74·04

Gentry	74·00
Medical men	72·93
Lawyers	72·78
Navy	72·62
Trade and Commerce	72·32
English Literature and Science	72·10
Aristocracy	71·69
Army	71·58
Foreign Literature and Science	71·44
Fine Arts, &c.	71·15
Painters	70·96
Chemists	69·51
English Literature (according to Chambers)	69·14
Members of Royal Houses (males) ..	68·54
Kings of England	64·12

The brief discussion which ensued, turned chiefly on the value of the obituary of the Annual Register;—which, some thought, had not the uniformity necessary to furnish data sufficiently precise for the construction of tables.

Mr. Neeld laid on the table of the Section, the 'Criminal and Miscellaneous Statistical Returns of the Manchester Police for the year 1845,' and chiefly directed attention to the decreased number of discharges in proportion to the number apprehended. It appeared that in 1841 the number apprehended was 13,345, of whom were discharged 10,208, or 76·49 per cent.; but in 1845 the number apprehended was 9,635, of whom were discharged 3,851, or 39·96 per cent.: he attributed this improvement to the efficiency of the Manchester Police Force, and described, at some length, the system established by the municipal authorities of that borough. It appears that a system of rewards as well as of punishments had been established, and a "merit class" of constables instituted, with a peculiar badge and an increased pay. He further mentioned that, during the past year, 16 lives had been saved by the police, and that out of 137 fires, 13 had been extinguished by the police alone, and 36 by the police and neighbours without the engines. As a further proof of the improved character of the police force, he noticed the decrease in the number of dismissals, which was in 1842, 70; 1843, 96; 1844, 99; 1845, 59; 1846, 18 for eight months, or at the rate of 27 per annum.

A paper was next read 'On the Annual Consumption of Coal, and the probable duration of the Coal Fields,' by E. R. J. Knowles.—The author's calculations being based, for the most part, on approximate estimates, many of which are open to much controversy, it will be sufficient for us to state the conclusions at which he arrived. He calculated the annual consumption of coal at 12,500,000 tons, and the extent of the coal-fields of England at 5,200 square miles, at the average of 20,000,000 tons to the square mile; and thence, after making allowance for the coal worked out, and for the population being eventually doubled, deduced that the coal-fields of England contain an ample supply for at least 1,500 years.

Sir J. Guest, Col. Sykes, and Mr. G. R. Porter, pointed out many sources of inaccuracy in Mr. Knowles's computations, and said that the estimates from consumption in various manufactories must always be vague. They thought that the only true criterion would be to ascertain the amount annually brought up to the mouth of every pit. Mr. Knowles professed his anxiety to obtain accurate information, and promised to make the inquiry in the form that had been recommended.

Mr. G. R. Porter presented an elaborate Report 'On the Iron Manufacture of Great Britain,' prepared at the request of the British Association.—Having called attention to the enormous demand for iron consequent on the general and simultaneous construction of railways in England, on the Continent, and in India, he said it was important to consider how that demand may be met, and also how, on the cessation of that demand, which must be temporary to a great extent, the ruinous depreciation of capital and suspension of employment, consequent on the change, may be averted. In 1788, the whole quantity of pig-iron made in England and Wales, amounted to no more than 61,300 tons; of which 48,200 were made with coke of pit-coal, and 13,100 from charcoal: in the same year the amount raised in Scotland was 7,000 tons. In 1796 the quantity, owing to Watt's improvement of the steam-engine, was nearly double, being—

England and Wales	108,993 tons.
Scotland	16,086 ,,
Total ..	125,079 ,,

Ten years later, viz. in 1806, when it was proposed to tax the production of iron, an inquiry was made, and the production was found to have more than doubled in this decennial period, being—

England and Wales	234,966 tons.
Scotland	23,240 ,,
Total ..	258,206 ,,

In 1823, this quantity had risen to 482,066 tons, and in 1830 it was further increased to 678,417 tons. But since 1830, in consequence of the introduction of the hot blast by Mr. Nelson, of Glasgow, rapid improvements have been made, and a most important saving of fuel effected. The results were thus stated:—In 1829, using coke and cold air, each ton of iron required for its production 8 tons, 1 cwt. 1 quarter of coal. In 1830, using coke and heated air, each ton of iron was made with 5 tons, 3 cwt. 1 quarter of coal. In 1833, using raw coal and heated air, each ton of iron consumed in its production, 2 tons, 5 cwt. 1 quarter of coal. The saving in fuel is thus seen to amount to 72 per cent.; and in Scotland the production of iron has risen from 37,500 tons in 1830 to nearly 500,000 tons in the last twelve months. There exists a prejudice against the hot blast iron which is gradually abating; and a similar prejudice long prevented the use of the black band ore, the value of which was discovered by Mr. Mushett so far back as 1801. In 1836, every iron-work in Great Britain was visited by M. F. le Play, chief engineer to the Paris Board of Works, and he estimated the amount produced that year at 1,000,000 of tons. In 1840, Mr. Jessop found that there were 402 furnaces in England and Wales, in which 82, or 1 in 5, were out of blast; and out of 70 furnaces 6, or 1 in 11, were out of blast. The quantity of iron made in 1840, was 1,343,400 tons; but in consequence of the commercial depression, this fell to 1,046,428 tons in 1842, being a depreciation of 22 per cent. He next directed attention to the effect of railways on the price of iron. In 1836 and 1837, Parliament passed 77 railway bills, of which 44 were for new lines, and the aggregate of extent about 1,200 miles, requiring a production of more than 500,000 tons of iron. The price of bar iron which had been 6*l.* 10*s.* per ton in 1834, rose to 7*l.* 10*s.* in 1835, and in 1836 to 11*l.*; but in 1837, the railway speculation had so far subsided, that only 15 acts for new lines were passed from 1838 to 1843,—the price of iron fell more rapidly than it had risen, and during this period, iron could be sold with difficulty at less than half the price it commanded in 1836. The average price of iron at Glasgow in 1844, was 2*l.* 5*s.* 6*d.* per ton; in March 1845, it rose to 5*l.*; and in May to 5*l.* 10*s.*;—this rise in price of 175 per cent., gave such stimulus to production, that the make of pig-iron, in Scotland, for the first six months of this year, was 260,000 tons, or at the rate of 520,000 tons per annum;—the production having been doubled since 1840. It is the opinion of the iron-masters that since 1840, nearly all the increased production of iron in the kingdom has been drawn from Scotland. It appears that the demand created by the new railways, has stimulated every establishment to its utmost limits of production. But, in order to add materially to the make of iron, a great many circumstances must concur. One of the chief difficulties arises from the workmen: skill is necessary, and the number of those properly trained is so limited, that they make demands for an enormous and disproportionate increase of wages on the first appearance of prosperity. Thus the cost of production seems to have more than kept pace with the rise of price. From this, combined, perhaps, with other causes, the amount of production in England for 1845 was only 917,500 tons, being 238,000 tons less than the production of 1840. From comparing several returns, it is clear that we have no reason to dread a failure of material,—some valuable and extensive fields of black-band ore having been recently discovered in Wales; but it seems not improbable that the Staffordshire iron-works will soon experience a deficient supply of coal. A new source of supply has been found in the refuse and waste of the lead mines of Weardale. The *rider* of the lead ore is a true carbonate of iron, yielding from 25 to 40 per cent. A small blast furnace has been erected, at Stanhope, for smelting this *rider*, and pig-iron of a strong and excellent quality has been produced. In consequence of this success, the company has commenced the erection of very extensive smelting works, near Walsingham. The difficulty then arises in the supply of labour. It is hopeless to stimulate the exertions of the persons already employed. They are naturally ready enough to exact higher rates of wages when the demand for their labour becomes more urgent; but, succeeding in this, they prefer to obtain the same amount of earnings, with higher rates of wages, to the securing of greater gains by the exertion of even the same amount of toil;—so that a greater urgency on the demand, may be, and frequently is, accompanied by a lessened production. During the period of depression the low price of iron led to its being extensively applied to various purposes of construction in civil and naval architecture. On the subject of iron ships, Mr. Porter entered into some calculations to show their economy;—but the subject will be found more fully discussed in our report of the Paper read by Mr. Fairbairn before the Meeting of the British Association in Glasgow, in 1840. Up to the beginning of the present century, nearly two-fifths of all the iron used in this kingdom was imported from the north of Europe; but in 1806 this proportion had fallen to one-eighth, and foreign iron is now only imported for the manufacture of steel. Our exports, on the contrary, have so increased as to become an object of national importance.—

In 1827 we exported 92,313 tons, declared value £1,215,567.
In 1845 ,, 351,278 ,, ,, ,, 3,501,695.

The increase of our exports appears to be contingent on a reduction of price, and must, therefore, be materially affected by variations in the cost of production. Should the new railways stimulate a much larger production of iron, the quantity produced will greatly exceed the demand so soon as those railways are completed, and then prices will fall, perhaps to a lower point than has ever yet been witnessed. This will, probably, cause iron to be applied to many new purposes, and particularly to the construction of ships, fire-proof houses, and frame-work houses for export to new settlements. All this, however, must be the work of time; and it seems but too probable that, in the meanwhile, our iron-masters will have to undergo a somewhat lengthened season of adversity,—for the enduring of which they are, in a measure, prepared, from former experience.

The length of time occupied in reading this paper, of which we have only given the outline, rendered it impossible to discuss its topics; as the hour for the General Committee meeting was fixed for 3 o'clock, and it wanted but a few minutes of that hour when Mr. Porter concluded.

To Correspondents.—A. B.—Rachel L.—J. R.—E. H.—S. S. S.—Amicus—received.

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